Designing an Effective User Interface for a Mobile Application

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Abstract

The purpose of this study was to determine the best user interface design practices for an iOS mobile application created for Pre-R, a local start-up company that offers physician house calls and telemedicine services throughout San Luis Obispo. The study included initial background research on best user interface design practices, mapping out and implementing the entire process of designing for mobile applications, conducting usability tests on potential users, and making changes according to the test results. Usability tests allowed for a greater understanding of the effectiveness of Pre-R’s mobile interface design prototype. Results from the usability tests have indicated a high potential for the success of this mobile application, alongside other suggestions on specific elements that can be improved upon. Suggestions for improvement include modifications on certain icons and pop-up notifications for easier navigational purposes.
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Chapter 1: Introduction

Purpose of the Study

A house call is defined as “a visit by a doctor to a home to provide medical care” (Herritt, 2012). Almost 60 years ago, house calls accounted for almost 40% of all physician-patient encounters; by the 1980’s, however, house calls accounted for only 0.6% (Leff, 2001). There was a lack of efficiency during house call visits, poor reimbursements being made to physicians, and other inconvenient factors that lead to the drastic decrease in the popularity of house calls (Herritt, 2012, as cited in Canadian Family Physician). However, with new emergence in technology and the increase in Medicare beneficiaries for house call physicians since the late 1990’s, the demand for house call visits has steadily been gaining more attention by the public (Landers, 2005). Since then, there have been an abundant amount of innovative ideas that have positively affected the medical industry. Telemedicine, formally defined as “the use of medical information exchanged from one site to another via electronic communications to improve a patient’s clinical health status” (American Telemedicine Association 2012), is one of many new promising technologies within the medical industry.

The development of a new mobile healthcare platform challenges the current healthcare market and business model. A trend has been emerging in this industry, encouraging some physicians to perform house calls for standard medical exams, treatments, and visits. A few small companies have emerged in the current health care market, promoting a business model tailored to doctors who prefer to make house calls and individuals who prefer to see physicians at home. Pager and Medicast are examples of companies that fit into this category.
Dr. Sam Slishman, a physician serving the San Luis Obispo community in addition to a community in Hawaii, has started a new company that combines the concepts of house calls and telemedicine. Pre-R is Dr. Slishman’s newly developed social experiment that strives in “making healthcare healthier”—through its mobile application platform, patients will be able to contact a nearby doctor for a house call visit when in need of a basic medical service. Its primary goal is to offer patients a service to come across before making the overpriced visit to the emergency room, hence the name Pre-R. Through Pre-R, Dr. Slishman hopes to establish an affordable and accessible health care environment in the area that he serves. With the touch of a button, the patient would be able to contact him, who will then prioritize and perform a local house call visit for the patient. Pre-R also provides a telemedicine service that allows patients to Skype Dr. Slishman when in need of a basic medical attention.

Dr. Slishman’s company is still in development. It is looking to improve the branding and graphic elements, which define a personality for the company and help with successful marketing. A small group of graphic designers and web designers are needed to rebrand the company. This group should design the company logo, branding guidelines, website, and mobile application, in addition to printed marketing materials.

Significance of the Study
Pre-R will meet the needs of two audiences—local doctors who offer services through the mobile app (clients), and the patients who benefit from this app (users). This may become two separate applications or two separate interfaces—one for doctors, and the other for patients. Inspired by the current popularity of Uber, Pre-R hopes to serve as an “Uber for
doctors” app that will benefit local patients in the San Luis Obispo area, as well as doctors, such as Dr. Slishman.

User Interface design is also important for both patients and doctors using the Pre-R services. A successful design will create easy navigation and provide comfortable, stress-free reading throughout the web and mobile experience. A navigable design is important for the specific group of patients who may be in a stressful or burdened state of mind when accessing the Pre-R service. Pre-R aims to provide a healthy and efficient way for local patients to receive medical care in these situations. The application design is intended to reflect these goals.

The choice of color, typefaces, layout, and navigation will influence the user experience. If these elements are consistent with the branding of the company, it will create a professional and cohesive experience for users. The Pre-R design team plans to create brand guidelines for the company, which will define a professional appearance as well as documentation for future design projects. In addition to a quality brand, the company will have documentation of these designs and the guidelines to follow when promoting or growing the Pre-R brand. The goal of the Pre-R design team is to create a professional and sustainable brand.

Documentation of brand guidelines with support later design projects, including printed marketing materials, website design, and mobile application design.

**Interest in the Study**

When Cynthia was looking for ideas on senior project, she coincidentally received an email around the same time from a student in the Computer Science department who was looking for a Graphic Communication major to help them with a potentially huge project that
requires a development of a mobile app. When she contacted him back for more information, she knew that this is what she wanted to do. She realized the huge potential for success that Pre-R had and immediately knew that she wanted to be a part of this group—the fact that Dr. Slishman wanted to go into a market that has not been established yet in San Luis Obispo meant that there will be lots to work on. She hopes that that joining this team will help her to gain the skillsets and experiences that she has always wanted to acquire. Helping out with UI design, updating their website, and creating marketing collaterals are only some of the tasks that she will be responsible for in this big project with the design team. To say that she is excited to jump into this amazing project with this team is an understatement.
Chapter 2: Literature Review

Introduction

Dr. Slishman’s new social experimental mobile application, Pre-R, involved bringing in a combination of physician house calls and telemedicine to the city of San Luis Obispo. A physician house call, in technical term, means a “visit by a doctor to a home to provide medical care” (Herritt, 2012). Telemedicine, according to the American Telemedicine Association, is defined as “the use of medical information exchanged from one site to another via electronic communications to improve a patient’s clinical health status.” Both concepts relate to one another in trying to provide care for patients at the comfort of their homes, which Pre-R aims to present. This literature review discusses research associated with house calls and telemedicine. It also analyzes brand identity and effective mobile application design and user experience that will benefit the development of our mobile application.

Historical Background: Physician House Calls

In the past, house calls were the standard method of providing care to patients before doctor’s offices and emergency rooms became the norm—the image of a family doctor with a black medical bag giving care to a patient in their home is nothing but classic. The benefits of house calls are prolific. Patients may feel uncomfortable or anxious at the sights of clinical waiting rooms, white coats, and strangers, therefore making house calls an advantageous substitute for patients (Herritt, 2012). Studies also show that “well-designed interventions at home can prevent falls, reduce disability, and even delay admission to a nursing home” (Campion, 1997). In addition, house calls could also spare patients with disabilities the discomfort and inconvenience of travel (Campion, 1997). According to an article from
UTMJ, house calls not only benefitted the patients but doctors as well, giving them a “perspective on the patient’s living situation, while interacting in an environment that is both familiar and comforting to the patient” (Herritt, 2012).

Even with these benefits, however, house calls experienced a drastic decrease in popularity the past few decades. From 1928 to 1942, there was over a 50% decrease in the percentage of general practitioners (Herritt, 2012). By 1980, house calls only accounted for 0.6% of all physician-patient encounters (Leff, 2001). Additionally that year, only 15% of 403,000 physicians in America were comprised of family physicians, which produced a devastating effect on the house call market (Herritt, 2012). Another analysis declared house calls a ‘vanishing practice’ in 1993 (Landers, 2005). The enormous decrease in the number of house calls can be attributed by several reasons, including but not limited to the lack of efficiency during the visit, the extra time spent traveling for physicians, and poor reimbursement for the physicians after the care (Herritt, 2012, quoted from Canadian Family Physician).

Furthermore, physicians had very limited access to medical devices that they usually would have had access to in their office during their visit to the patient’s home.

With the emergence of technology and the increase in Medicare beneficiaries, however, home visits have steadily been increasing since 1998. Research shows that from 1998 to 2004, the “annual number of house calls increased by 43%” (Landers, 2005). Since then, house calls have reduced the use of emergency departments and hospital uses (Herritt, 2012, quoted from the Journal of American Medical Association), which have also increased the amount of savings for patients. For example, average house calls would only cost about $100 for a short visit while a typical ambulance ride or a visit to the emergency room can cost up to around $2,000 (Herritt, 2012). Another example would be from a house call program in
Las Vegas, NV, that produced a 62% reduction in hospital days in a sample of 91 patients and saving $400,000 in that particular year.

**Emerging Market in Physician House Calls and Telemedicine**

As such studies show, house calls experienced significant decreases in the past few decades but are now steadily increasing in popularity. As mentioned, factors may include the increase in Medicare beneficiaries, the growth of support for physician house calls by the general public, and the rise of new technology. With the emergence of new technology in different industries, the medical industry has also experienced growth in new technology that has undoubtedly benefited the field the past few years. The capability of providing in-home care has increased dramatically over the past 10-15 years through the portability of electronic health records, equipment, and supplies (Bonvissuto, 2015). Herritt (2012) comments, “the black bag may now contain a pulse oximeter, portable ECG, glucometer and digital thermometer, but both its purpose and essence remain the same.”

Also among the many new innovative ideas that came into the medical industry is the concept of telemedicine, which is formally defined as “the use of medical information exchanged from one site to another via electronic communications to improve a patient’s clinical health status” (American Telemedicine Association, 2012). This new technology is constantly evolving and promises numerous benefits in the near future in health care services (Doarn, 2007).

Such benefits can be demonstrated by examining Kaiser Permanente’s Tele-Home Research. This research involved using “remote video technology in the home health care setting as well as the quality, use, patient satisfaction, and cost savings from this technology”
This technology has shown to be effective, well received by patients, capable of maintaining a quality of care, and have a potential for cost savings. Another example of telemedicine is shown in the computerized health information database from the Harvard Community Health Plan (Bergman, 1993). This database has the capability to send a message to the health service in response to a patients’ indication to a serious medical problem. The results came out to be extremely satisfactory—“of the households using the computer system for nine months, 90% gave it a high rating for the accuracy of its contents, its usefulness, and its user friendliness” (Bergman, 1993).

Leff and Burton comments (2001) “advent of telemedicine has provided the opportunity to develop a hybrid home care delivery system that incorporates the best aspects of the old and new home health care models.” Just as telemedicine has positively affected the industry, new opportunities and concepts will continue to emerge in the future as better technologies come forth.

**Analysis of Existing Services in the Market**

Pre-R aims to provide a mobile application experience within the healthcare industry that caters to both house calls and telemedicine in San Luis Obispo. Although this may be the first house call/telemedicine mobile application to emerge in San Luis Obispo, similar concepts already exist in the market today. For example, Pager is a mobile application service based in New York that provides “access to care for everyone, anytime, and anywhere”. A list of doctors is available for viewing as well as the list of services available and more. As a re-imagined concept of a house call to grab the attention of the general public, it requires the download of their mobile application to request a visit from a doctor near the patient.
Medicast is a similar mobile application that currently serves Miami, Los Angeles, and San Diego. These “Uber-inspired apps” hope to help in avoiding long wait times at the emergency rooms, keep children away from outdoor bacterial exposures, and create a convenient access to quality health care. Toby Hervy, Pager’s head of marketing and business development, writes “we’re using technology to make the house call—one of the best ways to get personal care—viable again” (Schmidt, 2014, quoted from Toby Hervy). Pager’s online website, as displayed below, demonstrates a simple interface that describes their services through a step-by-step introduction. The website also provides a link to their downloadable mobile application once they input their phone numbers.

Figure 1. Home page screenshot of Pager’s website

Figure 2. Screenshot of Pager’s website
Telemedicine has also shifted towards a similar direction by utilizing the video-chatting technology on mobile devices to offer quick services. Doctor on Demand and Ringadoc are only two of many mobile applications that allow patients to speak to a physician via phone or video chat (Schmidt, 2014). Although video-chatting functions do not allow doctors to physically provide their services in person, they have become a fast-growing field in which health care professionals can give a quick answer to a medical related question via video, email, smart phones, and other forms of new technology. Mobile applications as such may not completely replace all currently existing health care centers; however, they strive to serve as quick service providers for those living busy lives.

Figure 3. Homepage screenshot of StatDoctors website

Figure 4. Screenshot of StatDoctors website
StatDoctors is another telemedicine service that offers mobile “eVisits” to doctors through mobile device technology (Stat Doctors, 2015). It provides an overview of what their service entails through an interface that is easy to navigate through.

The Importance of Design and Brand Identity

As briefly shown through Pager and StatDoctor’s interfaces, such currently existing services in the house calls and telemedicine industry have each branded themselves in order to represent their companies in their own unique ways. Branding guidelines are commonly used in successful businesses and can also be beneficial to Pre-R if utilized efficiently. For example, Google, Twitter, Apple, and other successful corporations have documentations that outline the name and identity of each brand. Twitter’s online press page outlines how to convey the Twitter brand in a section titled “Brand assets and guidelines” (Twitter, Inc.). This may include details such as logo and trademark information, color schemes, fonts for web and print media, and other related marketing material. These guidelines provide a reference for anyone using the company branding or working on design projects. The importance of this brand identity is outlined well by Lois Geller in her Forbes article. She writes,

In one sense, perhaps the most important sense, a brand is a promise… You know what you’re going to get with a well-branded product or service. In another sense, a brand is a specific combination of logo, words, type font, design, colors, personality, price, service, etc…. When you think about your brand, think about all the elements: promise, personality, look, voice, service, attributes, memorability, even patina. (Geller)
As Geller summarizes, branding is everything that represents a particular service. As an up-and-coming company coming into the San Luis Obispo county area, Pre-R will have a brand identity of its own in order to create the “promise, personality, look, voice, service, attributes, memorability and [patina]” (Geller, 2012) that it continuously strives to develop.

A style guide is one tool that Pre-R can utilize to define brand guidelines. Style guides often include general design elements and offer a way to pass along criteria to designers. In an article from creativebloq.com, Paul Wyatt explains style guides and their common elements. He writes,

> When handing over a creative project, most agencies for freelancers include a document known as a style guide. This not only adds an additional air of professionalism to the work but rationalizes to your client the creative choices you made… Start off with: 1) a written overview of the company it’s for, 2) a rationale for the work carried out, 3) information about logos; font usage; colour palette; tone of voice, 4) photographic guides, 5) collateral information. If you have enough time, it’s worth adding some examples of logo and typographic usage as well as links to master artwork/ brand collateral templates and helpful contacts within your agency or company.

As such, following the basics of a style guide will allow Pre-R to request consistent design work from their designers. This creates a starting point for designers to communicate Pre-R’s brand in an effective way. A style guide may also act as a way for the company to reflect on branding guidelines and improve these over time.
Mobile Application Design / User Experience

Existing mobile medical applications provide examples for Pre-R to use as inspirations. The design of Pre-R’s mobile application will have limitations based on the services that the physician offers. However, the existing applications in the market can provide examples of successful designs that work with similar limitations. There are practices, design strategies, and User Experience (UX) design principles that exist in this market that can guide such design process.

User Experience design is a strategy that can influence the quality of website and mobile applications. Steve Krug, a web usability (or UX) professional, specializes in user research and UX-related professional skills. In his book *Don’t Make Me Think, Revisited: A Common Sense Approach to Web Usability*, Krug defines usability. He writes, “If something is usable—whether it’s a web site, a remote control, or a revolving door—it means that a person of average (or even below average) ability and experience can figure out how to use the thing to accomplish something without it being more trouble than it’s worth.” These ideas of usability reflect in the common fields of User Experience and User Interaction. In an article from UXBooth, Brendon Cornwell breaks down best practices in these areas of design. He writes,

Best practices in User Experience provide the framework for a repeatable process, a way for us to deliver the value of user experience in a reasonable amount of time, without making the mistakes of those who followed in our past. They allow teams to execute with a fair amount of certainty that they are doing the right thing, in the right order.

In the same article, Cornwell writes, “...delivering a fast, cheap and positive experience means knowing not only how to apply the best practices of user experience, but also when
to break the rules.” While best practices exist in this area of design for the web and mobile
applications, it is important to understand the limitations of the user or the limitations of a
unique product or service. Some examples of best practices in UX include Human Interface
Guidelines provided by Apple, Inc., which guide the design for iOS applications, and visual
design trends, such as iconography and templates (Cornwell). The practices, limitations, and
strategies for an effective User Experience and User Interaction will be essential during the
interface design process for Pre-R’s mobile application.

**Conclusion**

Although the popularity of house calls experienced a steady decline throughout the late
1990’s, the development of new technology has allowed for many new markets in medical
industries to revive the concept of house calls. Pre-R not only aims to bring back house calls,
but also strives to utilize current technology to create an efficient system for serving local
patients. As Pre-R’s development moves on forward, it will also utilize design principles,
User Experience strategies, and style guidelines in its mobile application to create a brand
that successfully represents the company.
Chapter 3: Methodology

Purpose

Dr. Sam Slishman’s new social experiment, Pre-R, strived to “make healthcare healthier” by offering personal house call visits to local patients as well as remote medical care through phone and video calls. While still in its development stages, the company needed to establish the branding and graphic elements that help with successful marketing. The designers on the team assisted with the overall brand, print and marketing collaterals, and the user interface for mobile. Therefore, the purpose of this project was to create an effective mobile platform for Pre-R using the best design strategies and principles. The objectives for the project were as follows:

- Create an interactive prototype of the mobile application using InVision
- Determine the best user interaction and user interface experience for both platforms by receiving feedback from potential users
- Assist in the redesign of Pre-R’s current website

Audience

The general audience of Pre-R was initially the residents and patients of San Luis Obispo. Age, gender, and other demographic information varied by patient. A main constraint to using this service was the need for a mobile device—an ideal user of the app will be a typical resident or college student in San Luis Obispo who has an access to a mobile device with data or wireless internet connection.
Procedure

In order to design the most effective branding and user interface for Pre-R’s mobile app and website, research was be conducted with potential users. Using the background research on guidelines for effective design principles, designers created a preliminary set of interface designs to show the ideal sample audience to test out. The users were given a specific set of tasks to perform that required users to navigate around the interfaces while the designers observed the navigation patterns. An example of a task included having the user pick a doctor who is currently available and is the nearest to the user’s current location. A series of questionnaire will also be given out for users to answer afterwards. Questions include “On a scale of 1 to 10 (10 being the most likely), how likely are you to download this mobile app for your own personal use?” and “were you able to successfully complete each task? If not, which task(s) did you have difficulty completing?” (Appendix A). The answers to these follow-up questions and results to the usability test observations provided the designers with helpful suggestions to better improve upon the user interface and the overall usability.

Analysis

The conducted experiments brought in various quantitative and qualitative results. The collected quantitative data allowed the designers to understand whether the users felt comfortable navigating around the mobile app, while the qualitative data results allowed for suggestions on the overall interface design for better usability.
Chapter 4: Results

Usability tests were conducted on a total of 20 anonymous local residents to allow for a greater understanding of the effectiveness of Pre-R’s mobile interface design prototype. The test was given out to a sample of our target audience, of that included local residents of various age ranges with a mobile device. The usability test included a few preliminary questions to help determine the general demographics of the audience, then proceeded into a brief scenario case that the users will read. The test then instructed the user to perform five specific tasks. Once the user had completed the attempt of the tasks, various follow-up questions were given out to allow each user to provide reflections and thoughts about their interactive experience with the Pre-R mobile application prototype. The overall results of the usability test are as follows:

Preliminary Question #1: What is your age range?

<table>
<thead>
<tr>
<th>Age Range</th>
<th># of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-25</td>
<td>13</td>
</tr>
<tr>
<td>26-35</td>
<td>3</td>
</tr>
<tr>
<td>36-45</td>
<td>2</td>
</tr>
<tr>
<td>46-55</td>
<td>1</td>
</tr>
<tr>
<td>56+</td>
<td>0</td>
</tr>
</tbody>
</table>

Various age ranges have been tested, although majority of the users tested fell between the ages of 18 to 35.

Preliminary Question #2: Do you currently have an address in San Luis Obispo?

<table>
<thead>
<tr>
<th>Address in SLO?</th>
<th># of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>17</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
</tbody>
</table>
Preliminary Question #2: Do you own a mobile device with available data or wireless connection?

<table>
<thead>
<tr>
<th>Own a Mobile Device?</th>
<th># of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>19</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
</tbody>
</table>

Of the twenty users tested, one user opted not to answer. The rest of the tested users owned a mobile device with data or wireless connection.

Follow-Up #1: Were you able to successfully complete each task?

<table>
<thead>
<tr>
<th>Successfully Completed Each Task?</th>
<th># of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>17</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Kind Of</td>
<td>1</td>
</tr>
</tbody>
</table>

Various comments were made in relation to this question. The user who was not able to successfully complete each task mentioned the glitches that occurred throughout the entire application, leading them to an incompletion of the tasks. Others were able to complete all tasks, but were confused in certain steps. For example, a user mentioned that the fourth step said to “request a phone call” but displayed an icon representing a form. A few other users mentioned the misleading iconography.

Follow-Up #2: On a scale of 1-4 (4 being the most helpful), how helpful were the tutorials in getting you to complete your tasks?

<table>
<thead>
<tr>
<th>How helpful were tutorials?</th>
<th># of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>No Response</td>
<td>1</td>
</tr>
</tbody>
</table>

This question received a diverse range of responses. Some said the tutorial was straight to
the point and clear, while the others thought the tutorial was not helpful since the app is fairly intuitive in itself. Others simply swiped through the tutorials without reading. Other comments included “short and simple”, “the green indicator light was helpful and makes it more organized”, and “it did not help me find out how many people were waiting in front of me”.

Follow-Up #3: The main reason for filling out the form is not to request a house call, but to request a preliminary phone call with the doctor to determine whether a house call is needed. Were you able to fully understand this concept while completing the tasks?

<table>
<thead>
<tr>
<th>Understand Concept of App?</th>
<th># of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>8</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
</tr>
<tr>
<td>No Response</td>
<td>1</td>
</tr>
</tbody>
</table>

The majority of the tested users did not understand the concept that the initial stage of this application is to fill out the form in order to request a preliminary phone call with the doctor. Of those who did not understand the concept, four users thought it was to directly request a house call for the doctor to come.

Follow-Up #4: Were the buttons clearly organized and understandable?

<table>
<thead>
<tr>
<th>Buttons Clearly Organized?</th>
<th># of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>13</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
</tr>
<tr>
<td>Kind Of</td>
<td>1</td>
</tr>
<tr>
<td>No Response</td>
<td>1</td>
</tr>
</tbody>
</table>

Thirteen users out of twenty thought the buttons were clearly organized and understandable. However, some were confused between the two circular “profile” and “request form” buttons. One user suggested creating two rectangular boxes underneath the doctor’s profile picture icon, one that says “info” and the other that says “request” in order to make them
more distinguishable and clear. Others comments include “didn’t know if profile button was just a picture or it extended to more information” and “tutorial did not advise that you can only click on doctors that have a green indicator next to them”.

Follow-Up #5: Were you able to understand the purpose of the app?

<table>
<thead>
<tr>
<th>Understand Purpose of the App?</th>
<th># of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>19</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>No Response</td>
<td>1</td>
</tr>
</tbody>
</table>

Follow-Up #6: If this mobile app were to launch to the public, how likely are you to download this mobile app for your own personal use? Please rate on a scale of 1 to 4 (4 being most likely).

<table>
<thead>
<tr>
<th>Likeliness to Download App</th>
<th># of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>No Response</td>
<td>1</td>
</tr>
</tbody>
</table>

13 out of 20 users tested showed an interest in downloading this app for their personal uses. Those who were likely to download the app thought it would be cheap and convenient. Others also mentioned the ER is very expensive, and communication with a doctor would be much more accessible through this app. Users saw a lot of potential in this idea and that they can see a user for it in the older community. Some users, however, simply did not need to contact doctors very often or do not usually download these types of apps. Other concern amongst the users was the cost of a house call and whether a health insurance was needed.
Chapter 5: Conclusion

It was generally agreed by our users that this mobile application has a great future potential among the San Luis Obispo residents. Nevertheless, there were a number of recommendations and suggestions made that may improve the overall design and experience of Pre-R’s current interface to better serve the users. Besides the occasional glitches and bugs that caused the beta version of the application to sporadically crash, various comments have been made during the usability test to better help the designers understand what the users were looking for and how they interacted with the application.

Analysis of Usability Tests and Other Recommendations

Although 17 of 20 tested users were able to successfully complete each task, most of the users seemed to have difficulty completing the fourth task, in which the users had to navigate to the form screen from the home screen. It seemed unclear to most users on what the form icon would lead to, and some users had to click around various different screens in order to understand that the icon lead to a form screen once tapped. Users suggested that instead of having an icon, a button with a concise wording would be more effective and easy to understand for the audience. Additionally, the users also recommended another button below the form button that says “profile”, which would make it easier for the users to understand that there is a separate screen consisting of a more detailed profile description of the selected doctor. Users seemed to be indecisive on whether or not the profile image is a button that can be tapped to continue on to another screen.

Another function within the mobile application that we received feedback on was the set of tutorials provided to the users to swipe through upon opening the application. One of the
follow-up questions asked the users on how helpful the tutorials were in helping them successfully complete the tasks, and the question received a diverse range of responses. The designers who observed the users’ gestures during their usability tests noted that some users swiped through the tutorials without paying close attention. Of those who briefly read through the tutorial screens before starting their tasks, about half the users mentioned that the tutorials were helpful, while the rest thought the application was intuitive enough to use without the tutorial. It can be surmised that, although tutorials may be unnecessary for some, having the set of tutorials available is a valuable functionality that would add to the overall experience for the users.

Conceptual Issues

A crucial concept that the majority of the users did not understand during the usability test was the idea that the initial stage the mobile application was to request a preliminary phone call with the doctor prior to the doctor conducting the house call. Most of the tested users believed that the submitted form was made for a direct request for a house call. A simple solution to this major issue may be to add a pop-up notification upon tapping the “submit” button of the request form that briefly describes the next few steps of the Pre-R procedures.

Future Opportunities

The usability test provided the designers with helpful feedbacks that could improve the overall interface and experience of the mobile application. Other opportunities that could be explored within the app include an internal payment system, where patients can conveniently pay the fees for a conducted house call through the mobile application. Another possible idea to look into may be to create another mobile application for the doctors who will be
serving patients through Pre-R. While similar in design and the overall look and feel as the patients’ mobile application, the doctor’s mobile application for Pre-R will serve as the hub where doctors will receive notifications whenever patients submitted a request form for them.
References


Appendix A

Pre-R Usability Test Given to Users

Informed Consent to Participate in a Research Project

Cynthia Kim, Student
Graphic Communication Department

Howard Vogl, Professor
Graphic Communication Department

Samuel Slishman, MD
Pre-R, Inc.

The purpose of this research is to study the user’s interaction with a mobile application. The results of this research will allow for a greater understanding of the effectiveness of the interface design. This study may benefit Pre-R in launching a successful mobile application to the public.

You are being asked to participate in this study by performing a brief set of tasks that require interaction with the mobile application. Your participation will take approximately 15 minutes. There are no risks or benefits in participating in this study. You are not required to participate and you may discontinue your participation at any time without penalty.

Your anonymity will be protected, as your responses will not be linked to your identity. You may also omit any preliminary or follow-up survey questions that you would prefer not to answer.

If you have questions regarding this study or would like to be informed of the result, please contact Professor Howard Vogl at hvogl@calpoly.edu, Doctor Samuel Slishman at samslushman@gmail.com, or Cynthia Kim at nkim06@calpoly.edu.

If you voluntarily agree to participate in this research as describe, please indicate your agreement by completing the attached questionnaire. Please keep this form for your reference and thank you for your participation.
Appendix A Cont.

Pre-R Mobile Application Usability Test

[Preliminary Questions] Please answer the following questions.

1) What is your age range?
   a. 18-25
   b. 26-35
   c. 36-45
   d. 46-55
   e. 56+

2) Do you currently have an address in San Luis Obispo?
   a. Yes
   b. No

3) Do you own a mobile device with available data or wireless connection?
   a. Yes
   b. No

[Scenario] After you have completed the section above, please read the following scenario and continue to the next page for directions.

You have been experiencing constant back pains for the past two days that you don’t know the reason of. Painkillers and various home remedies have not been helpful. You don’t have health insurance, and going to the emergency room will cost a load of money. You’re not sure if you want to spend the money just for a simple back pain. Therefore, you decide to contact a local doctor through Pre-R, which is a mobile application that can be used to contact a doctor for a house call.
Appendix A Cont.

[Tasks] Please read and complete the following tasks.

1. Open the “Pre-R” mobile application on the phone.
2. Carefully read through the set of tutorials by swiping right.
3. Once on the home screen, select a doctor who is currently available and is the nearest to your current location.
4. Request a phone call with the chosen doctor.
5. Once you have filled out the request form, find out how many patients are ahead of you in line for the doctor you requested.

[Follow-Up Questions] Thank you for completing the tasks. Please take a brief moment to answer the following questions below.

1. Were you able to successfully complete each task?
   
   Yes  No

2. If not, which question(s) did you have difficulty answering?
Appendix A Cont.

3. On a scale of 1-4 (4 being the most helpful), how helpful were the tutorials in getting you to complete your tasks?

   1  2  3  4

   a. Please explain your reasoning:

4. The main reason for filling out the form is not to request a house call, but to request a preliminary phone call with the doctor to determine whether a house call is needed. Were you able to fully understand this concept while completing the tasks?

   Yes           No

5. Were the buttons clearly organized and understandable?

   Yes           No

   a. If not, which buttons were hard to understand?

6. Were you able to clearly understand the purpose of the mobile app?

   Yes           No
Appendix A Cont.

7. If this mobile app were to launch to the public, how likely are you to download this mobile app for your own personal use? Please rate on a scale of 1 to 4 (4 being most likely).

1  2  3  4

a. Please explain your reasoning:

8. Please provide any other feedback or suggestions. (was the interface design easy to use and understand? What else could be done to make this a better experience for you?

This marks the end of the usability test.

Thank you very much for your participation!
Appendix B

Pre-R Mobile Application Screens
Appendix C

Pre-R Marketing Poster

The Problem.
The world of medicine can be financially deceiving. All too often, patients are overcharged for simple medical solutions. Not only is a visit to the doctor’s office expensive, but scheduling an appointment can also be a hassle.

The Solution.
To counter this problem of telemedicine, our team created a mobile application available on Android and iOS, that allows users to contact a nearby doctor to receive non-emergency medical care. After the completion of this project, Dr. Slishman will be able to use his Pre-R website and mobile app to provide convenient and affordable health care services for people in San Luis Obispo.

The Front-End.
iOS
- Modal View Controller Design Pattern
- Xcode 6, Objective C, Cocoa Touch

Android
- Modal View Controller Design Pattern
- Android SDK 21, Java

The Design.

Meet Sam.
Sam Slishman M.D. is an ER Doctor at Sierra Vista University Hospital. He has been an active member of the San Luis Obispo community for three years and is the driving force behind this project.

The Team.
Tim Acorda • Ryan Foletta • Kelby Hertanu (design)
Cynthia Kim (design) • Winfred Loo • Thomas Nguyen
Isabella Sarmiento • Brian Truong • Marek Zhang

The Back-End.
Server / Database
- Amazon EC2 Server and RDS
- Database (MySQL)

API
- PHP and Slim Micro Framework
Appendix D

Pre-R Branding

Pre-R Logo

Pre-R Color Palette

PRIMARY

SECONDARY

Pre-R Fonts

Avenir Medium
ABCDEFHJKLNMOPQRSTUVWXYZ
abcdefgijklmnopqrstuvwxyz
0123456789?!@&"';/.]

Avenir Light
ABCDEFHJKLNMOPQRSTUVWXYZ
abcdefgijklmnopqrstuvwxyz
0123456789?!@&"';/.]