



Infacare

## Paper Prototype, Testing, and Refinement

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Paper Prototype Overview

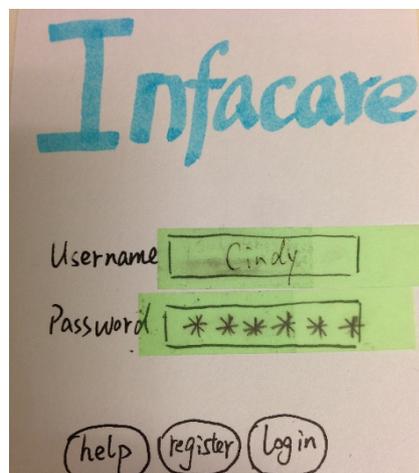
## Problem and Solution Overview

The problem that we strive to solve with InfaCare is that many pregnant women are interested in using today's technology to guide them and keep them informed during what is a very important time of their lives. Contemporary pregnancy applications (for example, the app named Pregnancy, by WebMd) are very word dense and not very user-friendly. They offer lots of information, but only a small

portion of it is interesting or useful to a given woman at a given time (according to some of the people that we spoke to). InfaCare is a pregnancy application solution that endeavors to marry the design concepts of minimalism and usefulness -- we want to present what information is desired and only that much information. This results in an app with a bold, visually-oriented interface that makes it stand out from the competing applications.

## Paper Prototype Description, with Overview and Close-Ups

In general, Infacare is aiming at helping pregnant women to keep track of their symptoms and communicate with doctors.



This is the first screen users will see each time they open the app. Privacy is a major concern regarding pregnancy, thus motivating a login for the app. Users might not want others to check information, such as when the baby was conceived and what symptoms the user is experiencing. Also, to prevent confusion, we have included a help button to give a general description of Infacare as a whole and advice regarding specific topics like password issues.

Baby name	Duration
Nick	Jan. 1st -- Oct. 18/2005
Mary	Mar. 20th/2012 - Jan. 3rd/2013

If users have a record of previous pregnancies on the application database and are not in an ongoing pregnancy process right now, the app will recall the previous pregnancies, allowing easy access to details of each record only with a click. Otherwise, they can click “new baby” to start a new pregnancy record.

New baby  
Welcome!

Your due date will be calculated by XX rule  
Average cycle length: ◀ 28 ▶ days  
Last periods:

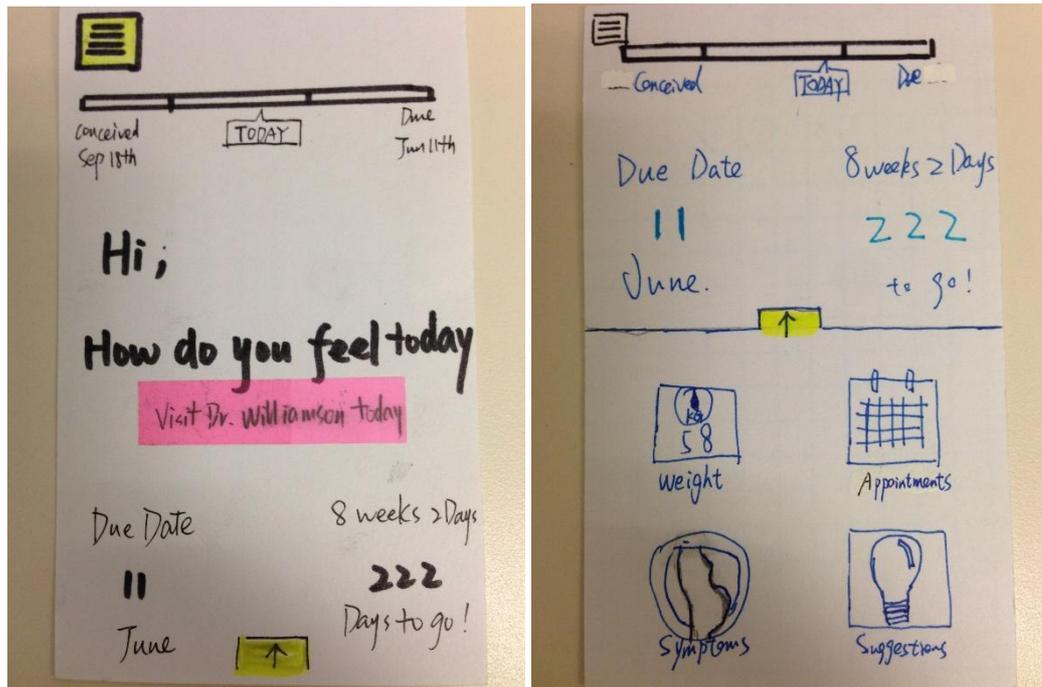
Sept	9	2012
Oct	10	2013
Nov	11	2014
Dec	12	2015

set Baby's Name  
Peters

set Due Date  
06.09.2014

Done

In order to start tracking a new pregnancy, users will enter the name of their baby and upload their own picture. Also, we have a nice little calculator to help them with the most important part--to set their due date. With these simple steps, a new record is formed.



When Infacare detected there's an ongoing pregnancy process, users don't need to view the pregnancy history first anymore. Instead, this will be the user interface right after login. With a minimalist design purpose in mind, we only put the progress bar on top and a countdown numbers at the bottom to tell users the stage they are at and how long they have the baby. Greetings and alerts will show in the middle when users set up appointment for that specific day. We also want to put a beautiful and appropriately themed picture with high resolution as background to make Infacare aesthetically pleasing.

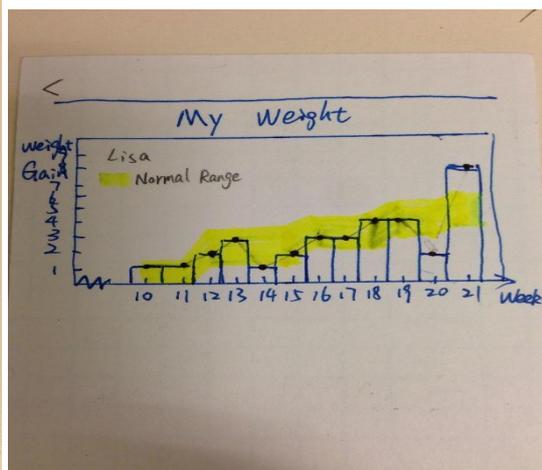
If users slide up, they'll see the main function of Infacare. We'll provide obvious visual cues for the slide up button by using contrasting colors.

< My Weight

Current Weight  
75 KG

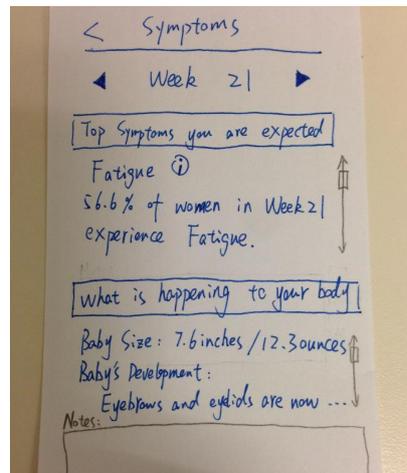
My Weeks	Gain	Normal Range	Current
22		4-7	
21	8	4-6	72
20	2	3-5	64
19	4	3-5	62
18	4	2-4	58
17	3	2-4	54
16	3	2-4	51
15	2	1-3	48
14	2		
13	2		
12	2		
11	2		
10	2		
1		0-0	45

View Chart

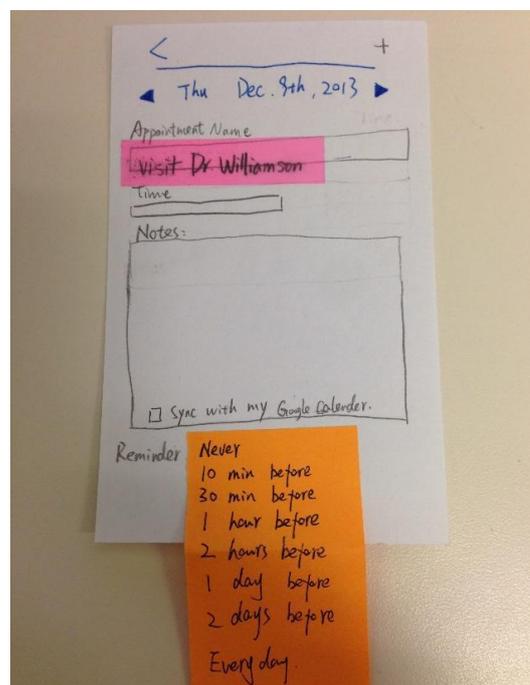
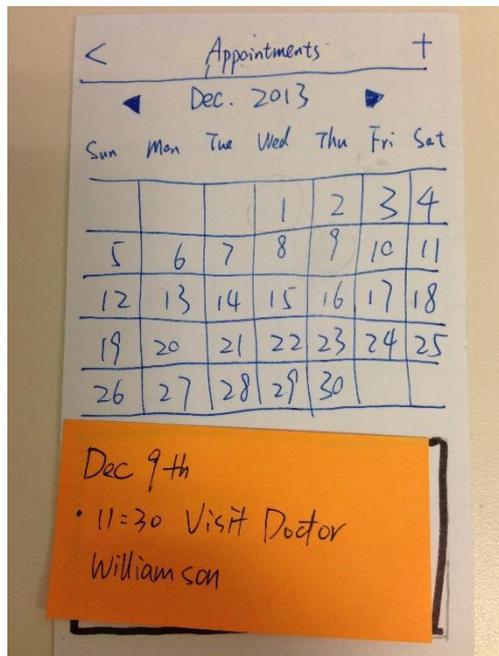


Recording and measuring weight are an important part of pregnancy since it indicates the health condition of both mother and baby. Users will be able to record

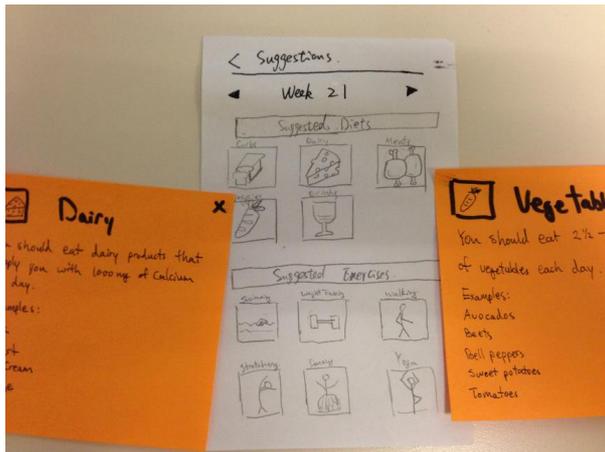
their weight every week and check whether they are on the right track by both charts and graphs.



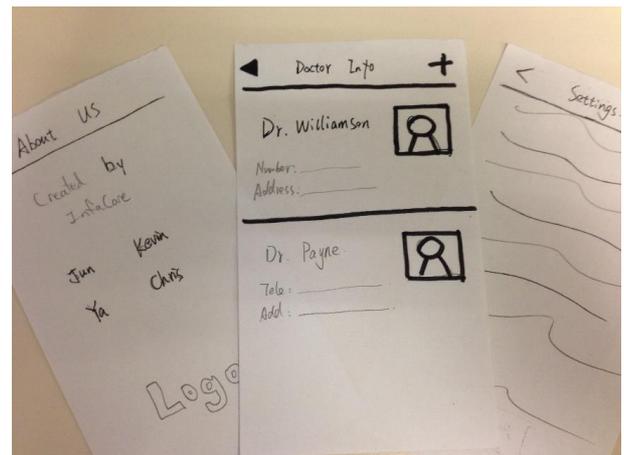
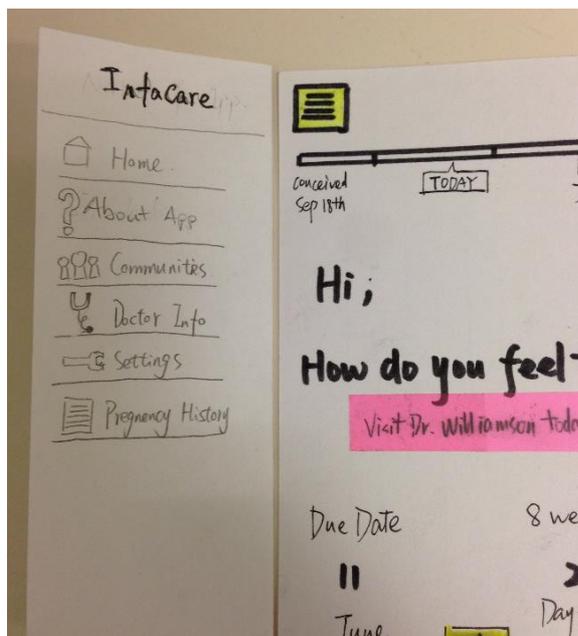
This page is the place where pregnant women figure out what symptoms are expected and what's going on in their bodies. We envision users coming here after experiencing a symptom, and then either being reassured that what they feel is typical, or deciding that they should make a note about the problem to discuss with a doctor. These notes can be synchronized with the calendar so that they are reminded of the symptom on the day of the next appointment.



This is where users can set reminders for their doctor appointments. What they entered in the "Symptoms" page will be automatically synchronized here in the "Notes" also. Additionally, users are provided with a drop-down menu with a couple of options rather than having to enter the time of alert themselves (recognition vs recall).



Finally, the “Suggestions” is where users get advice about diets and exercise might work best for them at a particular stage of pregnancy. We use thumbnail buttons to indicate various categories. Accordion windows pop-up when users click any of the buttons.



Users can also access to other options, basically these are less frequently used functions like checking the doctor information, settings and “about the app”.

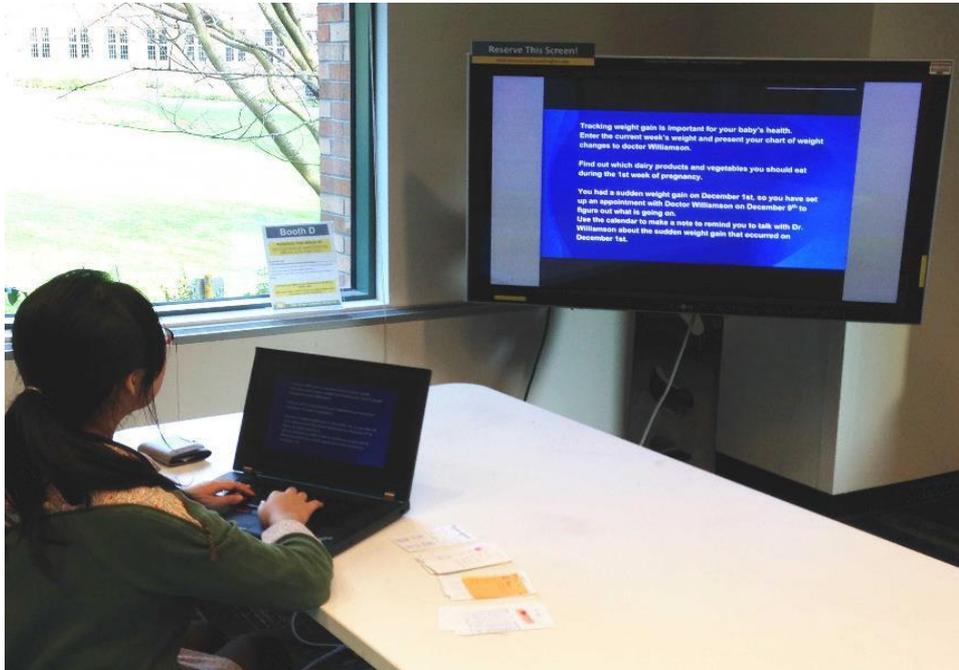
## Testing Method

### a) Participants

The four testing participants we had consisted of 3 female UW students that were randomly selected at the entrance of Odegaard library and 1 older female participant that is the mother of one of the team members. We selected these people as participants because they are all representative of the target population for the app we are designing. We are mainly concerned about making sure young females, who

are most likely going through their first pregnancy, can easily understand and use the app to obtain information that is helpful in getting them through their first pregnancy. We had one older participant who had experienced a pregnancy before in order to gain a perspective from someone who had been pregnant before. None of the participants we chose had been exposed to the project beforehand or had an engineering background.

## b) Environment



The student participants were tested in a study room in the library. We chose this quiet, neutral environment so the participants were in a location that they could be comfortable in. The test on the older participant was in the participant's home, again so that she could feel comfortable in her surroundings when testing. In the study room, we had the participants sitting at a table with the "computer" and filmer/facilitator on one side, and the note taker on the other. We did not allow the user to see the full interface before testing, instead only showing them 2 pieces of the interface within the demo (in order to demonstrate how to interact with a paper prototype). The tasks for the users were explained verbally and also projected onto a wall opposite them so they could look up and find the tasks at any time.

## c) Tasks

### Task 1: Food selection

Imagine that you are at the first week of pregnancy and this is the first time you have used Infacare. Find out which dairy products and vegetables you should eat during the 1st week of pregnancy.

This task involves the user finding information within the app about healthy foods to eat. They have to create a new account in order to access the main screen of the app. This task has them navigate to the "Suggestions" menu and find the dairy and vegetable categories to look up information about good foods to eat.

### Task 2: Weight tracking

You know tracking weight gain is important for your baby's health so you want to enter the current week's weight and present your chart of weight changes to the doctor.

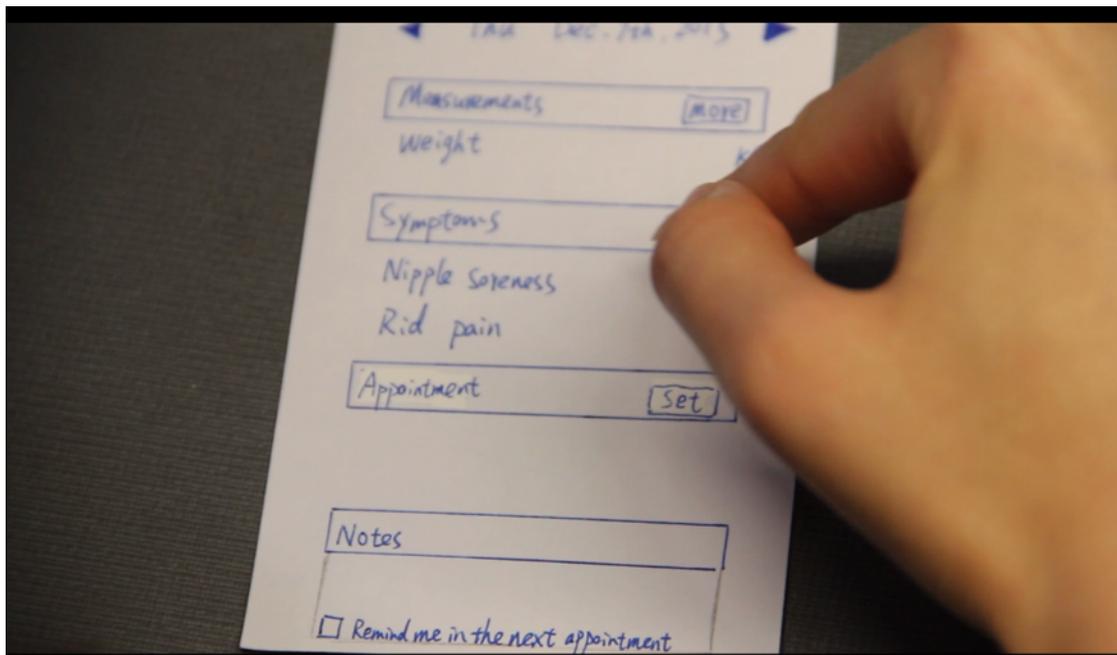
This requires the participant to use the weight tracking portion of the app to enter in their current week's weight. Afterwards, the user must pull up the chart of their weight history and show it to their "doctor".

### Task 3: Setting appointment reminder

You must set up an appointment reminder for your doctor appointment on December 9. Also, you experience some problem with your pregnancy before the appointment occurs. You enter this into the symptoms function of the app and ensure that the app reminds you to mention this problem at your next appointment on December 9.

Our third and most complicated task involves setting a calendar reminder and entering a symptom. Again, the user starts on the main screen of the app. This time, they are expected to go into the calendar portion of the app. They must create a new reminder and add in a name (relating to a doctor's appointment). In the symptoms section, they enter a note about an issue they experienced. Finally, they need to make the app remind them of this issue again when on the 9th, a notification pops up on the main screen of the app.

### d) Procedure



For the user testing, we had a fairly scripted procedure that we felt would not only explain to the tester what they would be helping us understand, but also to reassure them that we were in no way testing them. First, Ya introduced the purpose of the user testing and what was expected from the participants (Please see the Appendix for the script). Next, Ya answered questions that the participant had and provided them with a consent form (See Appendix) to sign. We also let them know that we would be recording a video of them interacting with the prototype, but that the video would only include that (as well as the instructions provided to them) and would

not show their face. When filming the testing, we took care not to have the user themselves in the recording, only showing their hands and the interface itself.

Next we gave a quick demonstration of how the user should interact with the interface. To do this, we gave them an example of a task (not one that we used for their tests) and had one of the group members perform this task so that the user could understand how they should go about interacting. At this point, we again answered any questions that the user had, as well as stressed that they were free to stop participating at any time. Finally, we provided them with their tasks by reading them off of a projection in front of them and presented them with the first page of the interface. From then on, the user was able to interact with the interface how they felt like they needed to and also could ask questions and get clarifications. During the actual tests, notes were taken about any snags the users experienced, as well as anything they seemed to do particularly well.

As a group, we rehearsed the whole procedure three times before the actual testing to make sure that all the parts go smoothly. We maintained the same roles for all three of the usability test sessions. Ya was the facilitator, Kevin was note-taker, Chris recorded the whole procedure and Jun was the computer.

### e) Test Measures

During our testing, we made an effort to interpret the user reactions in order to measure the level of confusion of the participant. We took special notice of any delays that seemed unnecessary and of any times when the user seemed to be looking around the screen, as if looking for a clue somewhere about where to tap next. While attempting to minimize our interference in the process, we occasionally queried the users regarding their thoughts. We did not record specific timings to complete tasks as we felt that the user's feelings and thoughts about what they were doing would be far more important than the speed at which they used the interface, especially in the context of people needing differing amounts of time to explore an interface.

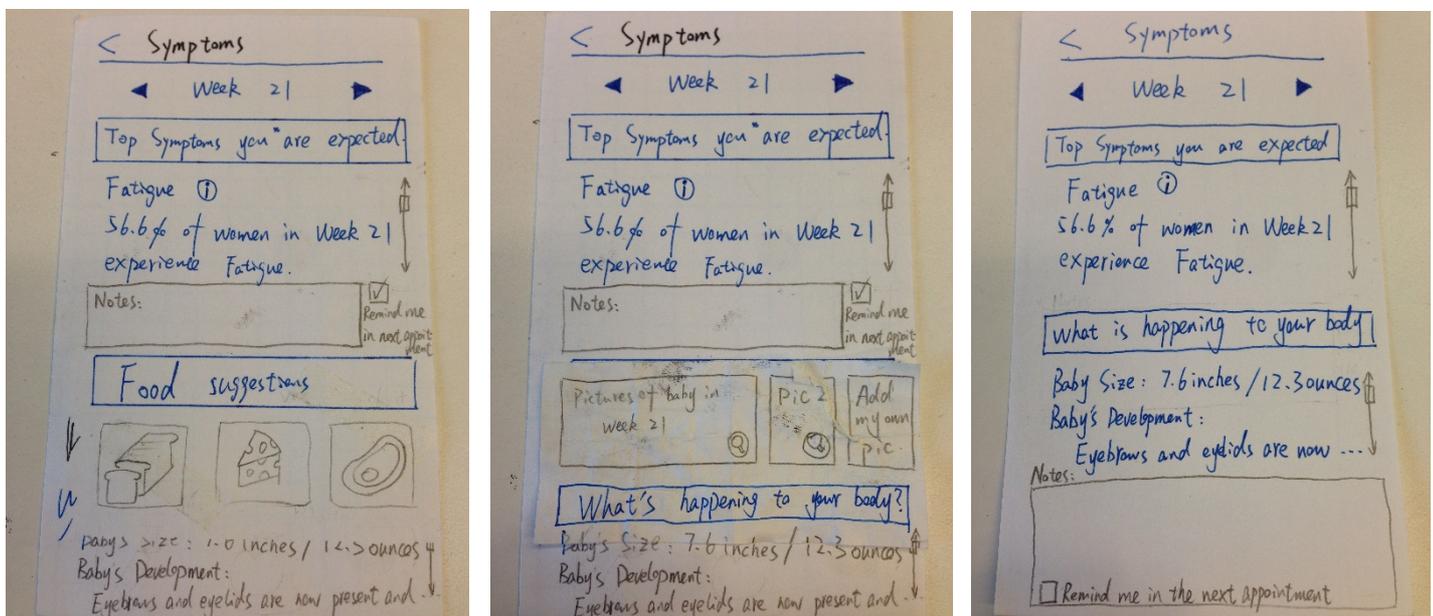
## Testing Results

Two common sources of confusion for our participants were the swipe for main menu access and the symptom feature. In order to make the interface simple and visually appealing, we designed a swipe bar that contains all the major functions (weight, calendar, symptoms and suggestions), only leaving the timeline and welcome sentence on the screen. Considering not all the users are familiar with the swipe gesture in iOS operating system, it might be confusing to them. As expected, all three of the users spent a longer time on the welcome page trying to find the main functions. However, after 10-20s delay they all swiped the arrow without any hint from the facilitator. Based on the testing sessions, we will be reconsidering this design choice in the future. During the third task, which is the most complicated task, we asked the participant to set an appointment reminder for a previously made appointment, scheduled due to a sudden weight gain during the pregnancy. They are expected to go into both the calendar and symptom portions of the app in order to complete this task. The fact that this task is a two-step process was confusing for the users, who were probably not expecting to have to use two different functions of the app. There are also some minor design flaws, such as an issue with the meaning of the symptom button, confusion about making appointments instead of setting reminders, and difficulties reading small text labels on suggestions screen.

The fourth participant, the older woman who was our only user to have experienced pregnancy, performed the tasks relatively well, but slightly slower than the younger users (possibly due to increased technological ability of youths). She did not realize that she should swipe up when in the main screen in order to access the various app functions (figure X). Whether this is due to a lesser familiarity with common application constructs, or due to a poor design choice remains a question, since the younger users had less trouble with this design feature. This user did not think that the weight chart should be called a chart, but rather a graph. This is a minor issue, but this word choice could reduce confusion among some users. This user's hesitation to tap suggestions in order to gain dietary recommendations was indicative that we might want to reconsider the names given to the application functions. These names should be very self-explanatory, since they make up the heart of the app. She eventually picked the correct function, but only after reading all of the text and deciding that nothing else seemed like the correct button to tap. For the difficult task, she had gotten used to the application design and was fairly fast at navigating to the main screen and selecting the correct function button. Working through the symptom and calendar page was slightly slow due to some apparent contradictions in the information fields. An example of this is that it is confusing to decide against receiving a reminder (by not ticking a check-box), but to have the interface still show, by default, that the user will be reminded an hour before the appointment. We revised these pages after learning of these concerns.

## Interface Revision Sketches

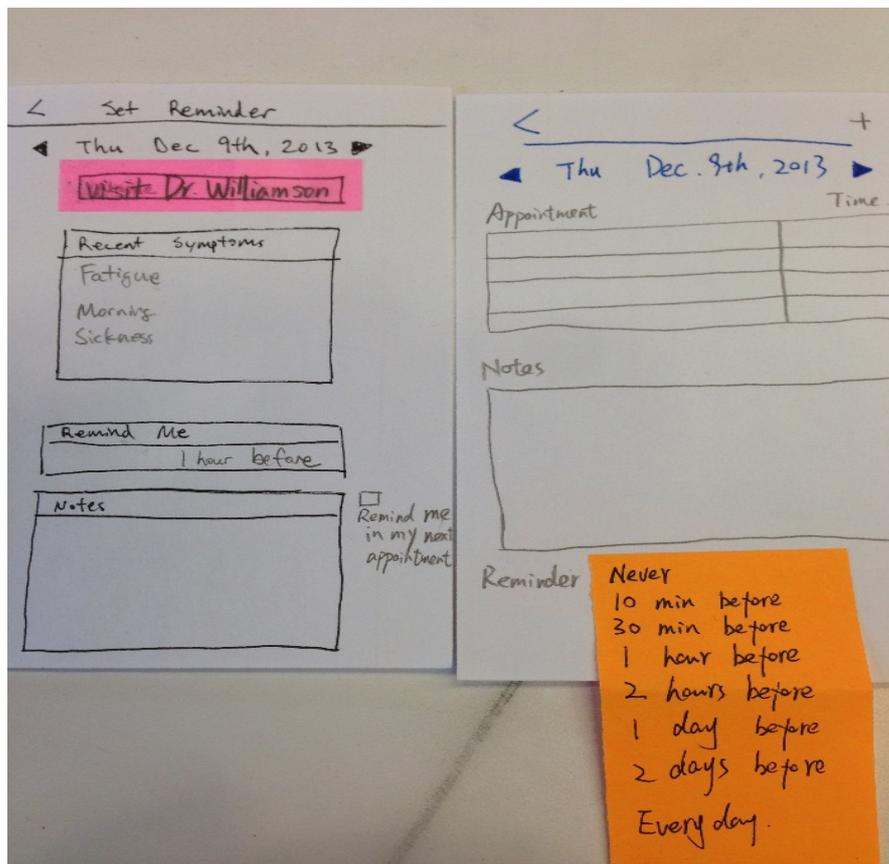
### Symptom page



Previously, we thought "Symptom" page should be the place pregnant women figure out what is typical of a pregnancy, both the symptoms and what's going on in their bodies. We consulted several pregnancy apps and most of them seem to have pictures of fetus in different stages. We want to test users' attitudes towards them so we include this as well as allowing them to add pictures of their own. It turns out to be meaningless because first, users expressed indifferent about whether they can see

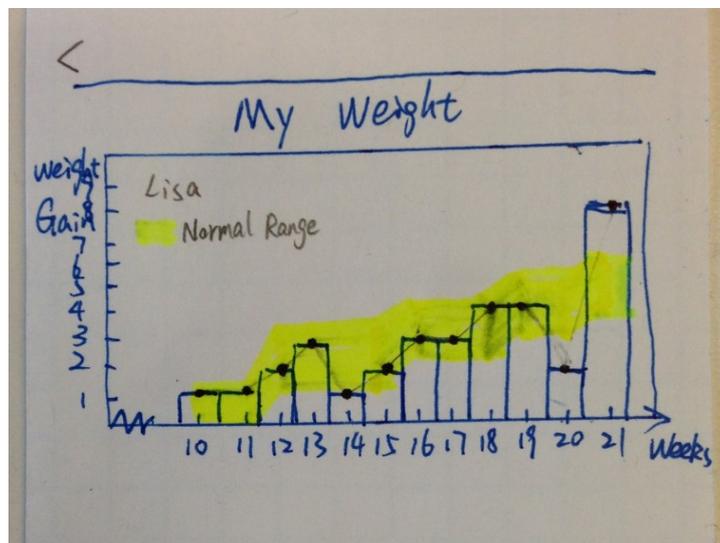
these scientific pictures as long as they got the instructions; second they cannot compare pictures because the only picture them can have is about how big their belly is. Eventually, we not only get rid of the picture stuff to make the interface more clear and neat, but also moved the “Notes” to the very bottom in order for users to compare their own symptoms with what they are expected to have. At the same time, what they entered in the “Symptoms” page will be automatically synchronized here in the “Notes”

### Set reminder page



Before revision, this is the page you’ll see when you click a specific date in the calendar, you can have a clear and brief overview of your appointment at the specific day. At the same time, you can take notes of your symptoms or other stuff you want to remind yourself and also set alerts for the appointment. However, according to the testing, users get easily confused about the correct place to write their notes as well as set reminders in the first place. Because they are also allowed to take notes under the “Symptoms” page, which make them wonder what’s the real point of the “Calendar” page. Considered the overlay of functions above we decided to change the name of “Calendar” to “Appointments” to highlight the real function to indicate that’s the only task users are supposed to do. This makes the whole process more intuitive. Accordingly, users are only allowed to enter the appointment name, time and edit “Notes”. What they entered in the “Symptoms” page will be automatically synchronized here in the “Notes” also. Additionally, users are provided with a drop-down menu with a couple of options rather than enter the time of alert themselves.

## Chart for weight measurement



After switching to bar graph

In the older version, we planned to have a page for detailing the weight changes for the user based off of the weights they entered each week. At first, we opted to use a scatter plot, but after our usability testing we changed it to a bar graph so it fits the data better and is easier for the user to understand. In doing this, we were able to better show the differences in weight change each week (based off of the height of the bars). What's more, we also added an indicator in a bright color representing the normal range of weight pregnant women are expected to gain for that week so the user can have a better understanding of whether their weight gain is normal at a quick glance.

## Summary Discussion and Lessons Learned

Our test users taught us many things about the design of our app that only outsiders to the project could. First, we finally got some information regarding how good of a design choice it was to require the sliding to get to the application functions. While these results were mixed, and confusion shouldn't linger after the first use once users have figured out how to use the app, we now have information that forms a basis for discussion when making any final design changes.

The user testing also highlighted the fact that the symbiosis between the calendar function (whose name we changed due to the testing) and the symptoms function can lead to confusion. This is because there are two places in the app in which notes can be entered, and a greater distinction between these functions will be useful.

There were other, more trivial, changes suggested to us by the user performances. The working and font sizes on food suggestion and symptom will be adjusted. The checkbox on the Symptom page will be modified accordingly. However, these are the prevailing topics that we will be discussing while finalizing our prototype.

## Appendices

### A. Consent form handed out to participants

#### Consent Form

The InfaCare application is being produced as part of the coursework for the University of Washington Computer Science & Engineering course "CSE 440: Introduction to Human-Computer Interaction". Participants in experimental evaluation of the application provide data that is used to evaluate and modify the interface of InfaCare. Data will be collected by interview, observation, video record and questionnaire.

Participation in this experiment is voluntary. Participants may withdraw themselves and their data at any time without fear of consequences. Concerns about the experiment may be discussed with the researchers (Chris Williamson, Ya Gao, Kevin Fan, Jun Qian) or with Morgan Dixon, the instructor of CSE 440:

Morgan Dixon  
Computer Science & Engineering  
University of Washington  
mdixon at cs.washington.edu

Participant anonymity will be provided by the separate storage of names from data and data will only be identified by participant number. No identifying information about the participants will be available to anyone except the researchers and their supervisors.

I acknowledge that I have been given an opportunity to ask questions about the nature of the experiment and my participation in it. I give my consent to have data collected on my usage and opinions in relation to the InfaCare experiment. I understand I may withdraw my permission at any time.

Name \_\_\_\_\_

Date \_\_\_\_\_

Signature \_\_\_\_\_

Witness Name \_\_\_\_\_

Witness signature \_\_\_\_\_

## B. Raw data and Experiment notes

Participant	Task	Notes	Ratings (0 - no problem to 4 - catastrophe)
1	Easy	1. Took a long time on main screen to pull up menu  2. Didn't view chart immediately after entering in weight data  3. Found out easily where to go to track weight	1.1 2.1 3.0
	Medium	1. Hard to read small text labels on suggestions screen	1.2
	Hard	1. Went to symptoms screen instead of calendar at first  2. Confused about making appointment instead of setting reminder	1.2 2.2
2	Easy	1. Took a while to find arrow to bring up menu	1.1
	Medium	1. Had some trouble understanding what dairy products were	1.0
	Hard	1. Had issues figuring out what the symptoms box on the calendar meant	1.1
3	Easy	1. Done very well Slight delay in finding arrow for menu	1.0
	Medium	1. Found things very quickly	1.0
	Hard	1. Had an issue with symptoms box on calendar day	1.2
4	Easy	1. Confusion about initial swipe-up  2. Thought chart button should be named graph	1.2 2.1
	Medium	1. Hesitated to tap suggestions for dietary suggestions	1.2
	Hard	1. Confused about reminder times	1.2 2.1

		2. Thought checkbox was too small 3. Wondered if you still get reminded if the box isn't checked but a reminder time is selected	3.2
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### C. Additional comments by users

Easy to use

Possibly be able to enter weight into symptoms?

Login page is weird

Might need something for unpredictable pregnancies

Be more specific and more creative for food suggestions (look at other eating apps)

Have nutrition to share into email and notes to view in other places

Arrow may not be intuitive

Small popup over menu arrow for tutorial or add "menu" to button