**Project 1**

**Mobile Adherence User Interface**

**Introduction**

This is a project about developing an application that improves outcomes for asthma sufferers through some combination of the principles of feedback, gamification or social networking.

First, some background:

Asthma is a disease of the airways that can make it hard for a person to breathe. In asthma, airways become swollen and narrowed (inflammation), and they produce too much mucus. The airways may also become "twitchy" and overreact (hyperresponsiveness) to changes in environment or activity by squeezing closed quickly and excessively (bronchoconstriction).

Asthma is a chronic disease that can result in suffering, disability, and even death. It is also very expensive. In the United States alone, more than $6 billion is spent on medical care for asthma annually, and about $1 billion more is lost through missed work days and decreased productivity. Nationally, there are in the neighborhood of 500,000 hospitalizations and 2 million emergency room visits each year due to asthma. The human suffering that lies behind these statistics, of course, cannot be quantified.

Asthma can be controlled. Medication, either breathed in (with an inhaler or a nebulizer) or taken orally (in the form of pills or syrups), is an important part of complete asthma care. There are many, many different medicines available to treat asthma, but there are two main categories:

1. CONTROLLER MEDICINES prevent asthma symptoms and asthma episodes. They give long-term control of the disease. Most of them get at the root of the main problem in asthma (inflammation). They need to be taken every day.
2. RESCUE MEDICINES treat asthma symptoms if they start. They provide short-term relief of coughing and wheezing, but they do not reduce inflammation. They are important to have around in case of breathing trouble. If you have to use these medicines more than once a day, it suggests that your asthma is not well controlled.

*[adapted from information found on the web pages of the University of Chicago, Department of Medicine, Asthma & COPD Center, http://asthma.bsd.uchicago.edu/AboutAsthma/index.html]*

In this project, you will focus on developing a mobile user interface that encourages asthma patients to follow their treatment regimen for a controller medicine. In this case, the controller medicine will be delivered by a dry powder inhaler. The inhaler itself is a small, pocketable, mechanical device that uses patient breath to deliver the medication. It has a built-in electronic sensor that records the time of each dosing event and can send this information to a receiving device (smartphone, tablet, “home hub”, or the cloud).

**Assignment**

Design a mobile UI that encourages your assigned persona (see below) to adhere to their controller drug regimen.

Specifically, your interface must include workflows that:

1. Encourage patients to take their controller medication daily
2. Encourage patients to self report their condition daily

Your system MUST contain three types of data:

1. Data returned by a sensor associated with the inhaler that
   1. gives a time stamp for each administration event
   2. gives a warning if more than 24 hours pass between administration events
2. Effect data as patient-reported answers to these questions:
   1. did you have any asthma attacks today?
   2. rate the severity of each attack today
   3. did you use your rescue medicine today?
3. For the third type of data, choose ONE of the following:
   1. private, two-way messaging between the patient and his/her primary care physician
   2. private, one-way messaging for alerts, updates, low battery warnings, etc. from the controller medicine inhaler or the device manufacturer
   3. public, two way but anonymous messaging between other users of the system
   4. any other relevant data type that you think might encourage adherence to the treatment regimen

Your design must be aimed explicitly at a the smart phone form factor for particular platform (Android, iOS, Windows Phone).

**Project Schedule & Submissions**

You will have 3 weeks to complete this assignment, however you will have interim milestones to complete that will count toward your final grade.

The schedule and deliverables are as follows:

1. 2/24/12 Project Kickoff
   1. Guest Presentation: David Maltz, Director, Device Technology, Novartis Pharma - Technical R&D
   2. Class brainstorming session
2. 3/2/12 Design Exploration
   1. ***Presentation of design concept***
      1. Concept sketches showing at least 3 different ideas for how to approach the problem
      2. Presentation board for selected direction
         1. Concept name that communicates theme
         2. A map of the information flow and feedback in the system
         3. Annotation/illustration explaining how the concept will encourage adherence
      3. Reasoning for choosing the particular concept
   2. Studio
3. 3/9/12 Design Refinement
   1. ***Presentation of wireframes***, as a series of sequential flows, for preferred concept
      1. workflow for data entry
      2. workflow for viewing adherence report
   2. Studio
4. 3/16/12 Final Presentation
   1. ***10 minutes presentations of final design***, including
      1. A diagram showing the key components in the system and the information flow between them
      2. High resolution wireframes of the UI's for viewing and entering data, including error cases
      3. An hypothesis, expressed in the UI's, for how feedback will encourage adherence
      4. A brief explication of the targeted platform and the specific challenges that implied

To receive a grade for this assignment you must submit your final presentation as a PDF to Coursekit by 9 am on 16 March 2012.

**Personas**

You will be assigned one of the following personas as your design target.

# Ramon

Ramon is 16 years old and a sophomore in high school. He is a standout athlete, lettering in soccer and track where he competes in middle distances. Two years ago he began to notice shortness of breath during sport activity. This had rapidly gotten worse and he had been diagnosed with asthma. The disease is well controlled by his inhaler, when he remembers to take it. Part of his problem following his regimen is the normal teenage boy irresponsibility, but part comes from the fact he is still a bit ashamed of the fact he has asthma as it feels like a kind of disability that none of his teammates share.

Ramon’s grades are OK, not great, with his greatest academic challenge being a difficulty in staying organized. He loses assignments, forgets to turn in homework, or fails to study for tests. If gaming were an academic subject, however, Ramon would be on the honor roll. Ramon has tried nearly every notable FPS, TPS and RPG out there and mastered more than a few. The amount of time he spends playing games, watching YouTube videos of others playing games and reading gaming reviews and forums also probably isn’t helping his grades.

**Evette**

Evette is a 38 year old working mother of two girls ages 10 and 8. She’s had mild asthma for as long as she can remember, and until recently was able to manage with a rescue inhaler that she needed only rarely. Lately however, her symptoms have gotten worse and she’d been prescribed a controller medication. Because the medication is new, taking it is not built in to her routine and some days she forgets to take it, often leading to an attack. Stress is a major trigger for Evette and with her demanding boss, demanding daughters and demanding, but often away on travel husband, stress is something Evette has plenty of.

Evette’s husband bought her an iPhone 4S which she likes to use, as a phone! Her husband did set it up so she can check email and look at her calendar but that is about the only other functionality she uses. When her kids complain that she doesn’t have any good games on her phone they are being polite--she doesn’t have any games on it, good or otherwise. She did install Facebook on the phone, but doing so didn’t really change her minimal usage of Facebook. She doesn’t understand how anyone actually has the time to waste reading posts from other people who are wasting time.

**Learning Objectives and Resources**

The learning objectives for this project are:

* gain experience working with the concepts of balancing and reinforcing feedback
* consider the impact of feedback delay in influencing behavior
* design a mobile display that links the compliance and response to communicate cause and effect over time
* design a mobile display for representing time-based data (the adherence part)
* design a mobile display for inputting subjective data (the effect part)
* consider gamification or social networking techniques as reinforcing feedback

Here are links to some useful links:

* http://captology.stanford.edu/invisible-resource/design-for-impact.html
* http://asthma.bsd.uchicago.edu/AboutAsthma/index.html
* http://asthmapolis.com/
* http://www.slideshare.net/fullscreen/PSFK/psfk-presents-future-of-health/

**Grading Rubric**

Notes to self to improve project design:

1. In practice, I didn’t track process quality very well, should probably change it to ‘concept’ or I need to plan exactly how I will evaluate
2. Should have an explicit ‘presentation’ criteria
3. Should be explicit about grading on completion of all required aspects of submission as defined in the brief
4. Need to add something about users mental model, need to have students describe this and demonstrate how design supports it

| **Quality** | **Poor (1)** | **Good (2 - 3)** | **Excellent (4)** | **Weight (%)** |
| --- | --- | --- | --- | --- |
| Process | Interim milestones are not completed with care or do not show directionality and iteration towards a goal. Final deliverable does not meet stated requirements or does not address the design brief | Interim milestones are well-executed and demonstrate clear intent to resolve a challenge. Final deliverable meets all stated requirements. Proposed solution is appropriate to brief and demonstrates reasonable awareness of the topic | Both the interim milestones and final deliverable demonstrate exceptional attention to detail and communication value. The final presentation is well-rehearsed and effective. The proposed solution demonstrates the impact of significant self-directed research on the topic. | 40% |
| System Design | The system concept does not make good sense, the designed workflows do not support the concept or the plan is overly complex with respect to stated purpose | The system concept presented is sound and complete in terms of mental model, information flow and feedback. All implied interactions are supported by workflows. The system appears efficient in terms of elements and interconnections. | The system concept demonstrates innovation in terms of purpose, mental model, or presentation. The argument it will influence behavior is compelling. The design is particularly elegant and parsimonious, including treatment of error cases. | 30% |
| Interface Design | The interface feels disconnected from the system model. The proposed layouts are inappropriate to the constraints of the chosen platform. The layouts are awkward. | The screen layouts are a good fit for the chosen platform, the mental model is expressed through the screens and interactions, the affordances are consistent with the system design and screens feel consistent across all the workflows. | The interface design demonstrates clear awareness of both the standard expectations for the mobile UI experience and particular sensitivity to the chosen platform. The narrative flow and interaction model for the system are simply expressed in the UI layout and behaviors. | 30% |