Recomminders: Efficient (re)Discovery

Low-fi Prototyping & Pilot Usability Testing

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Introduction and Mission Statement

Outdated and disconnected means of recording information mean we lose track of the things we want to do in our spare time. Often times, we blame our hectic lives for not being able to focus on the things we have always wanted to do -- but we believe we can change that. Our mission is to make our users happier by enabling them to remember things they have always wanted to do or even recommending things to them directly at an opportune time based on their past wishes. More succinctly, our mission statement is as following:

To be the invisible facilitator between you with busy schedules and all the exciting experiences that await you in the real-world. With us, you will start awaiting for excitement to come to you - and not the other way round.

Our team has created a solid prototype that aims to be easy to use, logical in its structure and useful for the user. After its development, we went out into the real-world and asked three participants to interact with our prototype. By asking first-time users to interact with our new-born UI, we are testing to see if our UI is quickly learnable, efficient, pleasant and even prone to mistakes. By asking our users to perform our representative tasks, then we are observing where they succeed and where they have difficulties with our UI.

Prototype Description

Our team has worked diligently to produce a great first low-fidelity prototype. We have targeted everyday touch-screen smart phone users as a platform for our application because we have determined that today people use their phones as a personal assistant. Our application, like an assistant, will remember things for you and recommend you to do things, and needs to be highly available. The smartphone, for this reason, is the perfect platform: ease of use, high interaction, fast and is readily connected to the rest of your data.

During the prototype's creation, we focused very much on the three separate tasks we had developed up until that point: input, organization and output. Our focus was on how the three tasks fit together, and we developed a system for 'advancement' within the application. Task 1 leads to Task 2, which then leads to Task 3 -- a very streamlined and directed workflow. This can be seen in our storyboards below, in Figure 2 and 3.

To truly emphasize this directed workflow, we separated each task into 'sections'. At the bottom of the screen are buttons that represent each task with labels such as "Inbox", "Organizer" and "Discover." Although each task is independent from the other in location, they build on each other. You start in the *Inbox* where you input information. In the *Organizer*, you can view your data and add more details to the inputs. Finally, in *Discover* you take

advantage of the information you've given the application, and let it propose activities. The tasks, in this way, build on each other from left to right.

As the tasks build on each other, it is very difficult to not have overlapping functions. Two such examples are:
- You can edit inputs from both the Inbox and the Organizer
- You can explore a recommendation - look for reviews, google, message a friend - from both the Organizer and the Discover page.

By splitting up the application so intentionally into tasks, we tried to make it as easy as possible for the user to learn to use the application. However, the presence of overlapping functions is a confusing factor. We tried to limit this confusion by adding an interactive feature that the whole application shares: a swiping mechanism.

To emphasize this feeling of 'construction' we developed a swiping mechanism adapted to all three tasks. This swiping mechanism is meant to represent a directed construction, and give the user intuition about how to use the application: if you swipe left you are going backwards in the process and if you swipe right you are going forwards. Consider Figure 1, describing what swiping directions signify.

Task/Direction	Swipe Left	Swipe Right
Inbox	Delete an input	Add detail to an input so it can be stored in the Organizer
Organizer	Edit an input so the app engine can better recommend you according to your updated wants	Explore the recommendation further or just do it
Discover	Refuse to do the recommendation now, and view the next recommendation	Explore the recommendation further or just do it

Figure 1. Table describing swipe function for each representative task

A problem we faced with swiping is that although it builds the user's intuition about how to use the application, its fluidity sacrifices feedback. This is an especially big problem for first-time users. We realized that if we swipe left to delete an entry, for example, then it is fast and efficient. However, this is a learned process and so we needed a way to teach the user. In our current prototype, we made use of short 'tutorials' the first time a user interacts with the application. Additionally, we sacrificed some fluidity with feedback: if you swipe left to

delete, then you will be asked to confirm your choice. We discovered that hitting the right balance between fluidity, intuitive function and sufficient feedback is very difficult.

Below are the tasks split up into component parts as storyboards. The "constructive" aspect of the interface becomes clear in Figures 2 through 5.
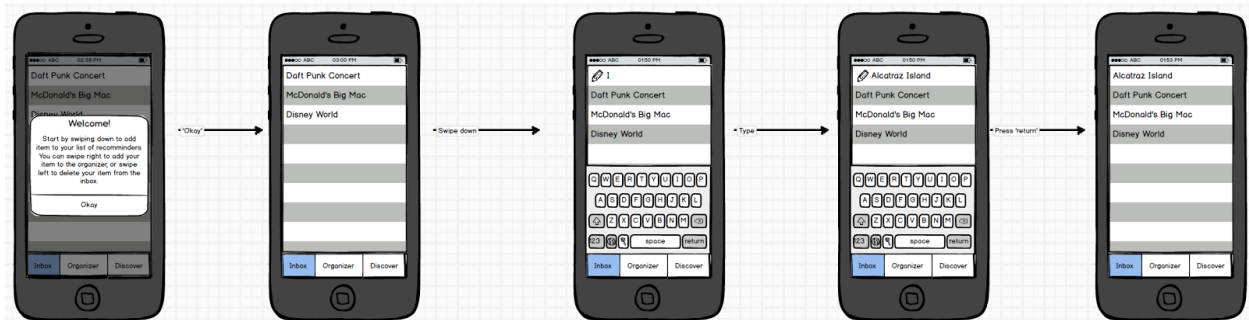

Figure 2. A storyboard of how a user would add an input into the Inbox: tutorial, list, add an input

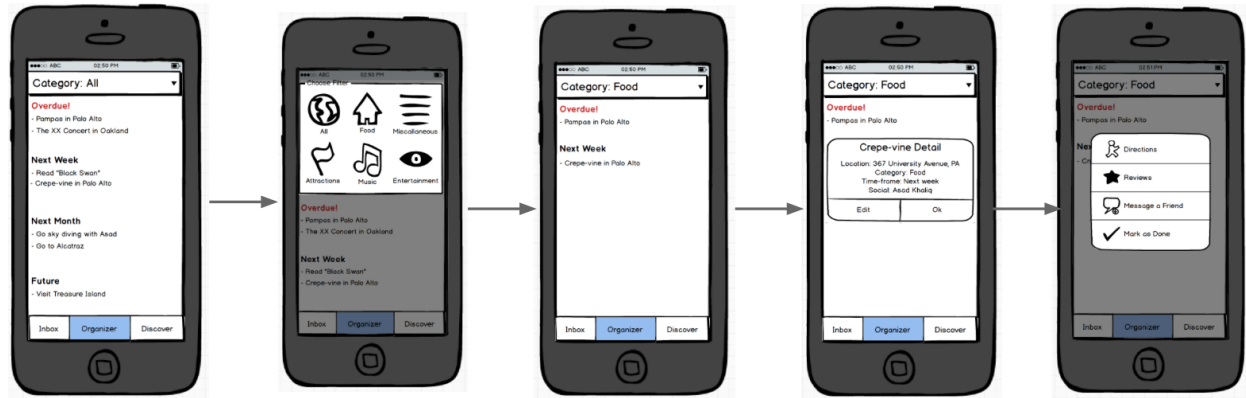Figure 3. A storyboard of how a user details an input

Figure 4. A storyboard of the Organizer experience: plain page, filters, filtered page, clicked input and actionable input
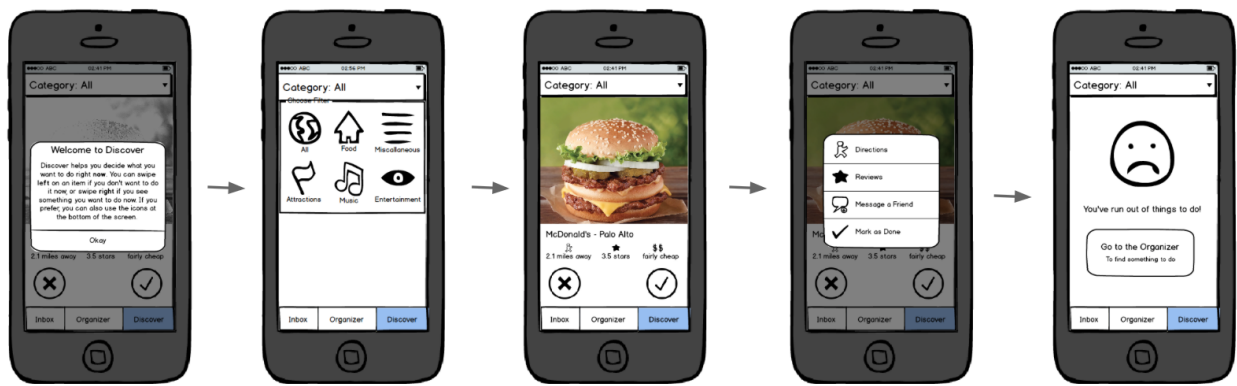

Figure 5. A storyboard of how a user would "discover": tutorial, filters, recommendation, actionable recommendation and final page

Method

Participants

Three participants were chosen to represent diverse demographic among everyday smartphone users. Our first participant was a male student who internet at STVP and is VP of an entrepreneurial society on campus. His background in technology made him an ideal first-user. The second participant was a female acquaintance of a group member, in her early 20s, who keeps her phone apps fairly up-to-date and aptly uses her smartphone to be provided with convenience in her life (She had more than five pages of apps in her iPhone6). She was generally quick in grasping the concept and was easily able to apply the general rule to each sections of our UI. The third participant was a Stanford med school student who we found at Nexus in his mid-20s. He has had a smartphone since college, but he never was fond of it, because he always could not find time to play with it (2 pages of iphone apps). This participant, unlike the first two, was less technologically-versed. All participants have received $10 Google Play gift cards as compensation.

Environment

Our test was set up in a lounge-type open space. Having considered in what setting our customers would most likely be when using our app, we did not set up any table, computer-like environment. Instead, we just let our users sit naturally on the couch with their cellphones, as seen in Figure 7 below.

Tasks

These participants were asked to deliver three different tasks each of which represented our three different sections - Inbox, Organizer, and Discover.

The first task was to quickly add a wishlist to the inbox, but without given any instructions from our team. He or she had to find he was supposed to do from reading the guidelines on the first screen that appears as in Figure 2.

Once the participant was comfortable with the first task, he was given the second task, which was generated by the question from a facilitator such as, "I think we should start keeping things in track." He is instructed to go to the Organizer UI and start editing information for each input he has made.

The third is to go to the Discover UI and get recommendations from the app on what he should do. He was expected to go through the recommendations and pick out the one he likes. Then he should appropriately take some actions (invite his friends, check in on social media, etc) and exit the app.

Procedure

Roles: Greeter (Asad), Facilitator (Ji), Computer (Edwin), Observer (Quentin)
1) Introduce the three representative tasks.
2) Choose one task of the three tasks, then instruct the participant to achieve that task.
3) Let the participant interact with the prototype, changing screens for transitions.
4) Ask and answer questions while observing the participant's actions.
5) Repeat steps 2-5 for the other two tasks.
6) Ask the participant for positive and negative feedback of the overall app design.

Test Measures

Prior to user-testing, we decided on some critical test measures to gauge actual performance of our main tasks. The first was success rate: could our users complete the task? This doesn't tell the whole story, however. On the way to success, users can encounter a few glitches. The second measure, then, was errors associated with specific tasks. Errors can be related to UI specifics such as unintuitive swiping motions, or simply misunderstanding what the task required the user to do. For example, as seen in Figure 6, our second participant was confused with not being able to click on certain inputs. Thirdly, time taken to complete a task was measured more casually, as we predicted it would be strongly correlated with difficulties encountered with the prototype. Fourth, we looked at a

user's interactive path within a task. This meant that we would notice when the user took a correct path and when the user took an incorrect path and had to backtrack. Fifth, we followed a user's subjective satisfaction with specific tasks and actions, and more widely with the product.

With the qualitative user measures, we found that we received a lot of repeated feedback. Users came across the same problems repeatedly although sometimes in different ways. For example, Participant 1 misinterpreted how to delete an input whereas Participant 2 did not know this function existed. Overall however, qualitative measures usually yielded repeated results.

On the other hand, we found that our quantitative measures provided interesting insights into the usability of the prototype, but only to a limited extent. Collecting data about how many times a participant goes down an incorrect pathway is more useful if done for more participants - say 20. Quantitative results over such a small sample can lead us to accept outliers as truth, so we took much of these results with a grain of salt.

Figure 6. Participant 2 faltering while trying to click on an input

Figure 7. Experimental setup

Results

Issues with swiping

The text "swipe right" / "swipe left" is not easily understandable, as participants were confused if this meant swiping to a side on the screen or if it meant dragging an item to a side. On the "Discover" page, we used a Tinder-like swipe UI wherein users are shown pictures of things to do and can either swipe left or right. One participant commented that this was slightly unintuitive for people who had not used similar interfaces in the past.

Slow transitions

Due to the wide variety of screens and options in the app, the team member acting as the "computer" often took a while to process the participant's request and bring up the next screen. This meant the participant was less easily able to visualize the overall function and flow of the application and means that we might need to rethink the way we prototype our app in subsequent stages.

Confusing Vocabulary

"Timeframe" - We introduce the concept of setting a "timeframe" in which the user wants to do a certain thing - for instance, doing something or going somewhere within the next week; the next month; or the next year. However this confused one user who thought "Due Date" was a more appropriate term. Perhaps this is because our idea is somewhat analogous to a todo/task application, and we need to either re-frame that in the eyes of users or stick to more familiar terminology.

"Discover" - The name of the last "phase" and last tab in the application flow is "Discover". It is meant to be the final stage after curating and organizing the things the user wants to do and is a way of finding things to do now. The application goes through the user's Organizer and arranges items in a way we believe maximises the chances of the user taking action (e.g. by time, location, etc.) However the use of the word discover led two participants to believe that this was a page where we would recommend *new* things to do and explore, not collate existing items from the user's Organizer.

A more guided experience

Upon first use, the Organizer screen does not greet the user with a popup or any helping tips, and so is slightly hard to acquaint oneself with. In addition, throughout the app, participants noted that there should be some tutorial-like elements and helpful reminders, at least for the first few uses, to guide users across the app flow and UI.

Ability to search across the application

Users mentioned that once the inbox/organizer have a lot of items, they would like to be able to intuitively search across screens. The iPhone invokes search in most lists via a swipe down on the screen, which conflicts with the "Add New" gesture we had planned.

Issues with specific tasks / screens

Inbox Page items are not clickable: A user's first instinct is to click items and see what further actions are possible. However inbox items can only be swiped; whilst items on other screens such as the Organizer can also be clicked. This results in a mental disconnect for the user who is never entirely sure what elements are interactable until they get used to the app.

On the Inbox and Organizer pages, the user has to press the return key on the keyboard once they are finished entering text. In our paper prototypes, it was not clear that the keyboard disappears once this is done; and so there was some confusion as to whether there was an extra step in addition to pressing the return key that needed to be done.

Discussion

Broad Issues

Issues with swiping

An intuitive solution to a swipe based interface needs to be found, and we must ensure that the action of swipes is consistent across screens. If we cannot find a way to make this work, and swipe gestures remain disparate across tasks, then perhaps the UI interaction has to be rethought - participants suggested potentially having a more cluttered but simple UI. However, we believe that swipe gestures are not easily communicable through a paper prototype, and are much easier and intuitive on a phone as evidenced by the success and ease of use of apps such as Clear and Tinder.

Slow transitions

This makes prototyping difficult, but should not be an issue in the final "coded" prototype. However, we may need to find more innovative solutions to prototyping such as more interactive prototypes (write with pencils / allow user to write instead of having pre-typed examples).

Confusing Vocabulary

"Timeframe" - we don't believe that "due date" is appropriate for our use case and so we either need tutorials to immerse the user in our application flow and methods or to rethink and re-frame this portion of the app.

"Discover" - We agree that this is misleading, but we also want to consider whether this is functionality we potentially want to implement within the app in addition to our existing implementation. If we do not go down this path, a more appropriate name such as "Now" needs to be implemented.

A more guided experience
This is harder to do with paper prototypes, since we would have to predict and react to a lot of the user's moves. This may be more possible with a medium fidelity prototype - certainly would be implemented in a high-fi coded prototype.

Ability to search across the application
We would like to rethink our "swipe down to add" gesture across screens, since this is inconsistent with iOS UI in general. In lieu of the gesture, we may need to add a button that says "Add New" at the top and reserve the swipe down gesture for search.

Issues with specific tasks / screens
Inbox Page items are not clickable: We do not have any functionality for inbox clicks, one potential solution is to implement a slight "bounce side to side" animation similar to the Clear task manager that implies that the item is swipeable but not clickable.

On the Inbox and Organizer pages, the user has to press the return key on the keyboard once they are finished entering text: We believe this is only a fault of paper prototyping and will not be an issue in a hi-fi prototype.

Rethinking the scale of the application

Our users also made several comments about the focus of the application. There was universal agreement that the core mission is a significant one - we all have things we want to do, but don't end up doing. However we received comments on both alternate directions we could take with our exact implementation as well as refinements.

For instance, one user commented that we should tailor the application completely to college students in addition to a greater focus on social integration and the concept of "bucket lists" that many students have. A further alternate direction was applying our ideas to a travel application - in a new area we are visiting, we are much more likely to need guidance on exploring and discovering our surroundings as well as keeping track of all the things we need to do.

We are now brainstorming UI improvements as well as potentially growing and pivoting our core idea to a more focused and functional experience.

APPENDIX A: CONSENT FORM

The Recomminders application is being produced as part of the coursework for Computer Science course CS 147 at Stanford University. Participants in experimental evaluation of the application provide data that is used to evaluate and modify the interface of Recomminders. Data will be collected by interview, observation 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 (Asad Khaliq, Quentin Perrot, Edwin Park, Ji Park) or with Professor James Landay, the instructor of CS 147:

James A. Landay
CS Department
Stanford University
650-498-8215
landay at cs.stanford.edu

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

I hereby 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 behavior and opinions in relation to the Recomminders experiment. I also give permission for images/video of me using the application to be used in presentations or publications as long as I am not personally identifiable in the images/video. I understand I may withdraw my permission at any time

Name _____

Participant Number _____

Date _____

Signature_____

Witness name _____

Witness signature_____

Introduction
Hello! Would you be willing to participate in a small user interface test for a mobile application we're developing? We have a basic paper based prototype for a phone app that we've designed as part of an HCI (human computer interaction) class. Depending on how long you want to chat, we can test for up to 45 minutes, but the basic experiment shouldn't be longer than 15 minutes or so. We'd love to buy you some coffee for your time!

Introduction to goals and mission
We think that often, there are things we want to see or do that we don't end up doing - like going to certain restaurants, or shows, or events. We'd like to change that. Thanks for helping us out. Today, we just want to test basic usability for our idea. We have a human "computer" here who simulates the screens of our application by moving papers around for you, and we just want to see how you feel whilst using the application. If thoughts such as "wow, that was easy to do" or "i'm not sure what to do from here" occur to you, please do let us know. This is only a reflection on our application and we'd love to improve it.

Confidentiality form
Before we start, we want to let you know that this test is completely confidential. You're not identified by name at any point in our project submissions and your test data is only kept amongst our team. This form has some more details.

Procedure
We are going to ask you to utilize the app to help you out with three different "scenarios" we present to you. I'd be happy to help you through things and discuss whatever questions you have, while Edwin will act as the computer and shift through the UI screens. Just interact with the paper screens as you normally would with a new app on your phone and we'll do the rest. We won't give you too much help at first since we want to know how intuitive our ideas are, but if you get stuck at any point we're here to help you out.

APPENDIX C: SCENARIOS/TASKS GIVEN TO PARTICIPANTS

Scenario 1
The first phase we'd like to go through is the process of storing things you'd like to eventually do. For instance, imagine you're out with a few friends at a bar and one of them mentioned a cool art exhibition that you'd like to attend at some point. We just want you to open up the app, and store this event in the app.

Scenario 2
You've now added some things you'd like to do to our app! We've got a healthy inbox with a few things that interest you. The next step we want to look at is curation. Imagine you're at home, with a few hours to kill. As a task, let's say you have Crepevine in your inbox, and you'd now like to add some details such as when you want to go, who you want to go with, and anything else you can think of, to the Crepevine entry in your inbox. Let's say you want to go to Crepevine within some point at the next week, and you want to go with a friend named Asad.

Scenario 3
We now have a bustling organizer full of things you'd like to do at some point. Let's say you're now in Palo Alto with a few hours to kill. We'd like you to use the app to find something to do, then look up directions to the place as well as reviews for it. Finally, we'd like you to mark it as done - and we're done!

APPENDIX D: RAW PROCESS DATA, WITH SEVERITY RANKS

Severity Ratings
- 0 = no problem
- 1 = cosmetic problem
- 2 = minor usability problem
- 3 = major usability problem
- 4 = usability catastrophe

Participant Number 1
- Swipe right (the text) is confusing which direction **(3)**
  - Use symbols?
- Press return after input **(2)**
- Due date instead of time frame: vocab **(1)**
- Discover is like outside what I already want to do: NOW is a better word **(2)**
- If you don't use tinder it's hard intuitively **(2)**
- Last page… ran out of things to do so can't do them **(3)**
- Some functions need to be explicitly taught – got stuck, didn't know how to continue (especially when there weren't directions) **(3)**
- The detail page was a little hard to get fingers into… **(2)**
- Despite the color, it was hard to know what he had to select **(1)**

Participant Number 2
- Tried to click on inbox input, but nothing happened **(2)**
- Maybe instead of swiping, it could be easier to just click **(2)**
- Swipe right/left is confusing in instructions **(3)**
- Did not know that items in the organizer were clickable **(4)**
- Transitions between tasks was slow by the computer **(1)**
- Swiping is not immediately intuitive: needs careful explanation. **(3)**
  - Some of our tasks had instructions but were poor
  - One task had no instructions and it was really hard
- A lot of decision paths were not yet implemented **(3)**
- Thinks the organizer should be obviously clickable **(4)**
- Searching in the organizer should be easy because if you have a lot of things **(2)**
- Bucket list that is fun targeted to specific type of audience like students **(2)**
- She thought discover was a page recommending things I've never inputed **(3)**
  - Should change the name
- Could be used as a travel app: add a bunch of things you want to do in a specific place and it will remind you accordingly **(2)**
  - New tool and aspect!

Participant Number 3

- Swiping right/left confusing **(3)**
- Was little confused with how the three interfaces are connected or if they are even connected **(4)**
  - Wait, how is the thing in this first section (inbox) get typed in the second one (organizer)?
- The "Social" button on the Edit section seemed pointless, if there is nothing he could do to actually call/text his friends, what is the point of having it? **(2)**
- The inconsistency between how to get to Edit interface from Inbox interface and that from Organizer interface is very confusing and not instinctive **(3)**
- He would have used it in his senior year of college, when he had a lot of "bucketlist" things to do before graduation **(2)**
- "I feel like guys wouldn't really use it. Maybe girls might like to get recommended to do little things. Thus more focus on details and design?" **(2)**

Inbox
- Swipe right: add new detail to the input when you have downtime - transitions you to the detail page
- Swipe left: delete the input
- Swipe down: new input in raw inbox

Organizer
- Top tool bar with name of "Filter"
    - When you select the toolbar, the toolbar shifts downwards (to half screen), the background fades, and new filter options appear
    - Filters are exclusively category type: food etc.
    - Click and the tool bar moves back up
- **Default: ordered by time frame**
- Want to view detail of event: click and the rest fades out
- Swipe left: takes you to edit/detail page
- Swipe right: toolbar with icons that take out of the app, back fades out
    - Message
    - Google
    - Maps
    - Review

Discover
- Top tool bar with name of "Filter"
    - Default is "ALL"
    - Click toolbar to change type of category filter
    - Icon page moves down (to half screen), back fades out, and gives you filter options
    - Swipe Left: don't do it
    - Swipe right: same toolbar as organizer pops up, back fades out

Top Toolbar Filters (Organizer default: time frame; tinder default: ALL)
- Category
    - All
    - Food
    - Miscellaneous
    - Attractions
    - Music
    - Entertainment
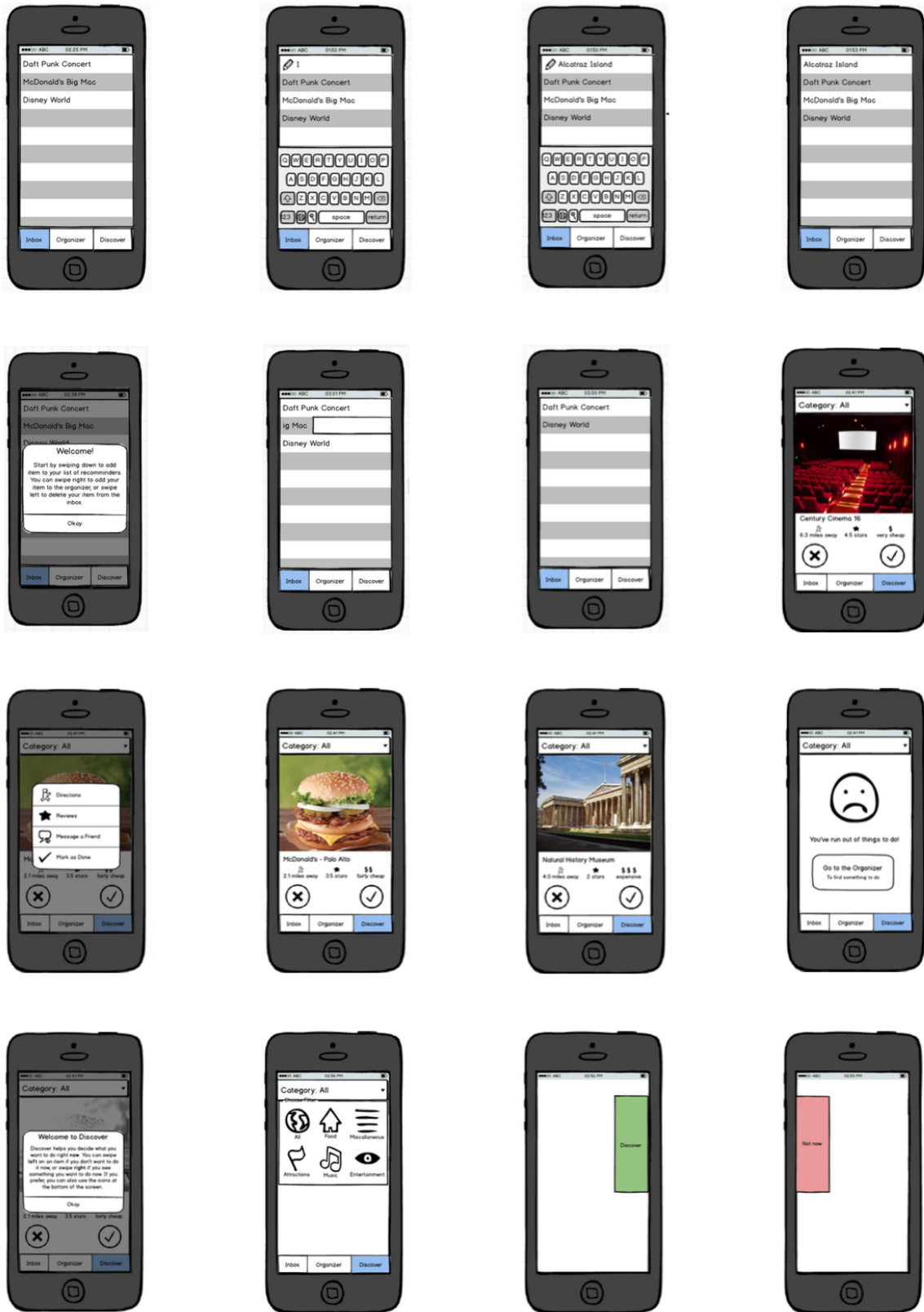   - Etc.

APPENDIX F: IMAGE OF ENTIRE SYSTEM

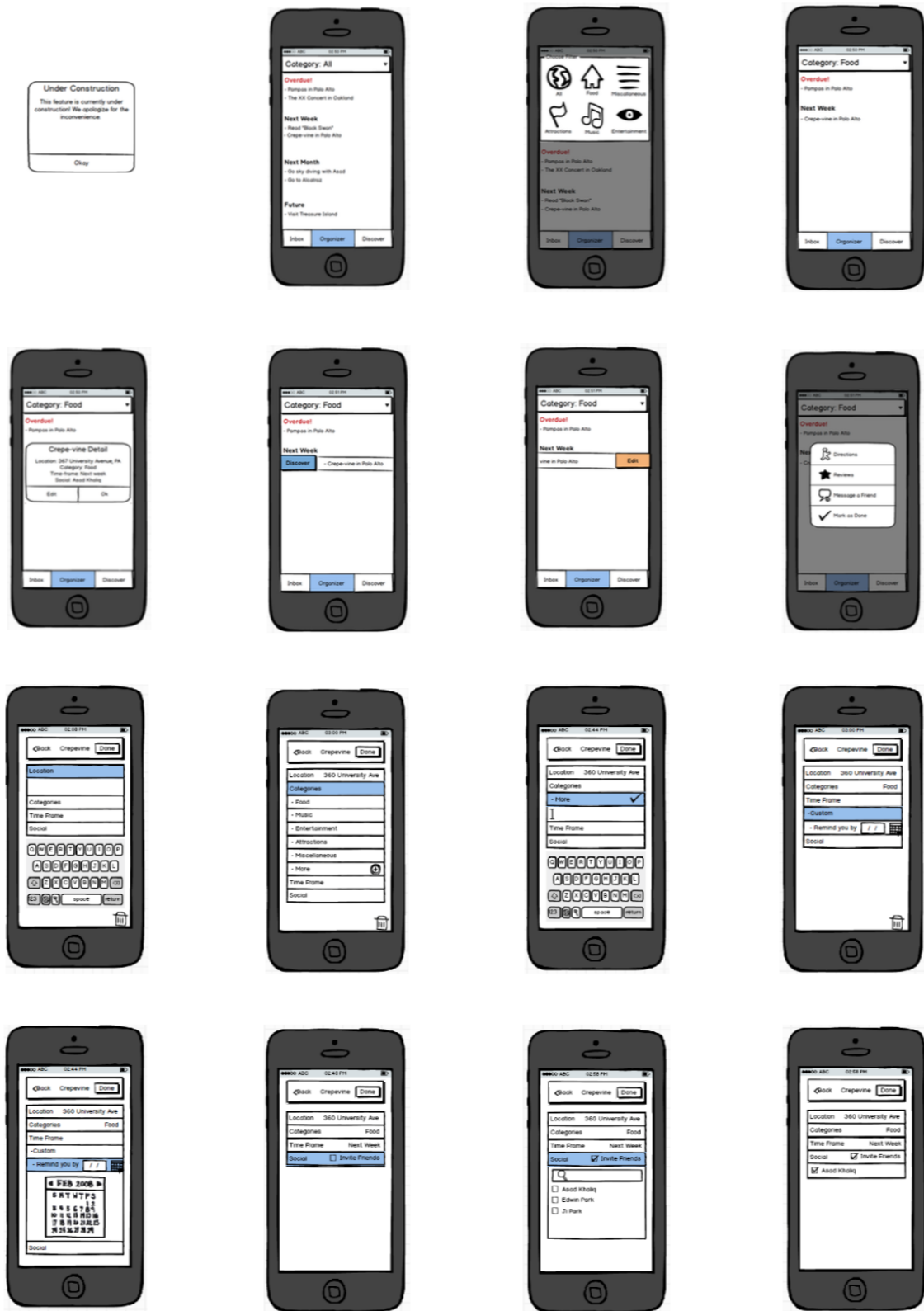*Figure 8a. A complete overview of the entire prototype and its components*

Figure 8b. A complete overview of the entire prototype and its components