ATM redesign

Interaction Design Studio I | Section A
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what do we want from an ATM?

It's two o'clock in the morning.

It's cold.

It's raining.

And every time you look back, you see the same person conveniently walking several paces behind you on the other side of the street.

All you want to do is withdraw some money from the ATM.

Most likely, you just want the quickest and most secure transaction possible. You're in a rush to get home, and you want to minimize your risks because it's nighttime in what appears to be a dangerous area. You don't want anything fancy - you just want to get your money safely and get out.

As such, this process book will document my attempts to design an ATM that will prioritize these two criteria: how quickly you can use the ATM, and how secure you are and feel while using it.

> ## goals
> 1) *make the process of using the ATM **quick and intuitive***
> 2) *allow the user to make a **safe and secure** transaction*

iteration 1 – security

For my first attempt at a design, I started off by doing some research into how ATMs work and analyzing the features of a variety of ATMs. I had actually never used an ATM before, so I looked up instructions and images of ATM interfaces online and asked my friends who regularly used ATMs about their experiences using ATMs to get a better idea of how they worked.

One thing I found that many ATMs lacked were physical security features - which I thought was one of the most important things that an ATM should have. Thus, my first sketch describes the physical features around the ATM's interface, which would provide the main functionality for increasing security.

There are visual barriers on either side of the interface to prevent people standing beside the ATM from seeing what the user is doing.

Another feature I added to increase security were mirrors angled so that users can see the space directly behind them. This was done to give users more awareness of their surroundings.
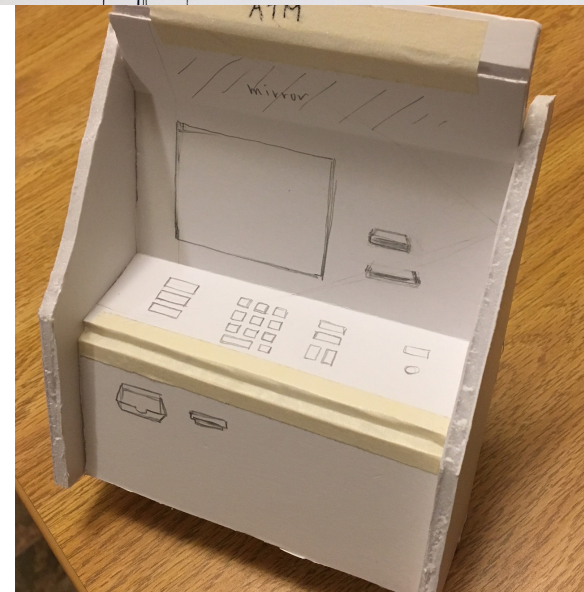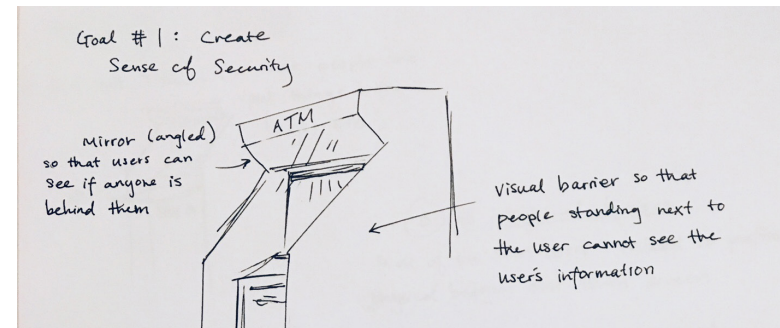

A sketch of the security features of my ATM design and a miniature physical prototype displaying the security features.

iteration 1 – layout

For my first iteration, I tried to make the interface follow a left-to-right, top-to-bottom flow. I made the starting point at the top-right, because most users were probably right-handed and would be used to inserting their card with their right hand.

Then, I figured the next thing the user would do would be to choose their desired action, so options for withdrawing, depositing, and viewing the user's balance were placed on the leftmost side of the next row. After that, I assumed the user would have to input numbers (e.g. how much they want to withdraw), so I put the number pad in next. Little did I know that users would've needed the number pad for putting in their PIN numbers earlier in the process.

One of the ATM users I interviewed told me that he liked physical ATM buttons, so I made all of the controls physical and independent of what was on the screen. I didn't realize it at the time, but looking back, this was a bad idea - all of the possible buttons were on the interface, making the interface cluttered, and users don't know when to press what.
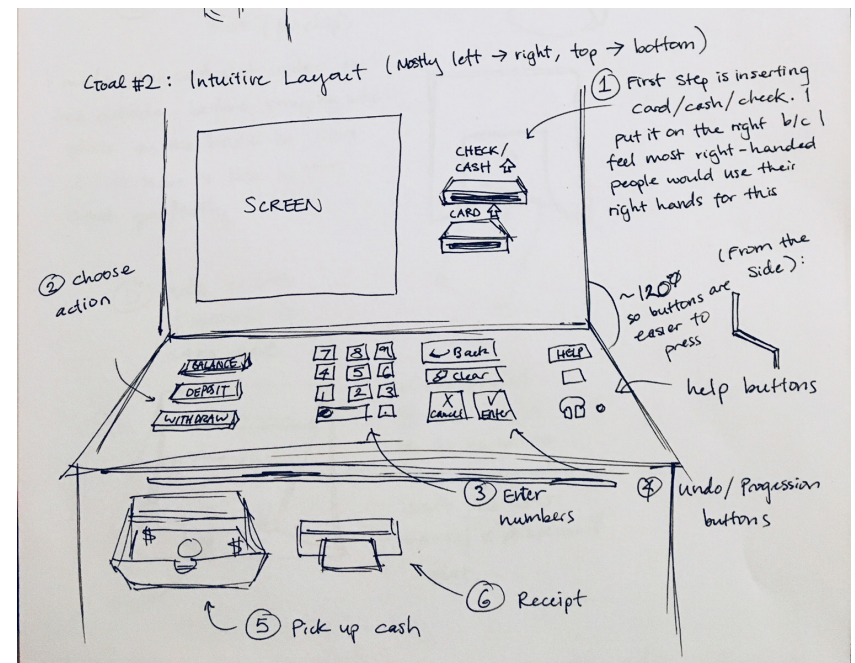
A sketch of the control layout that I proposed, following a left-to-right, top-to-bottom approach to guiding the user through the process.

iteration 1 – physical prototype

For my first physical prototype, I focused on creating examples of physical interactions with the controls.

First, I crafted the credit card slot with angled cuts on the sides to guide the user in inserting a card.

Then, I constructed the cash dispenser with an open area on the bottom so that the fingers could more easily grasp the money.

Lastly, I built a button using two pieces of styrofoam, the spring from a pen, and a layer of tissues between the styrofoam for balance. The spring provided a nice resistance and a little click to give the user auditory feedback that they had pressed the button.

In hindsight, this should have been one of the last things I did. I should have focused more time in the beginning optmizing the high-level use of the controls.

Some physical prototypes I created. They were built to demonstrate how the user was supposed to interact with the ATM on the small scale - inserting a card, retrieving money, and pressing a button.

evaluating an existing ATM

The main feedback that I got from the first design I submitted was that I should choose a single ATM and redesign it, rather than drawing inspiration from a variety of ATMs and trying to design a new one from scratch.

Upon choosing an ATM to evaluate, I put myself into the context that I had described earlier - what if I was in a dark, cold, and dangerous situation? How would I feel about using this specific ATM? I actually withdrew money from an ATM so I could better understand how I could improve its design. Unfortunately, I did not have a good experience.

I did not feel very secure while getting using the ATM. While the interface did have walls to the side, they were not big enough to block off the view of someone standing about 45 degrees from the interface. Also, since I was facing a wall, I was unable to be aware of my surroundings.

These two problems were accounted for in my initial sketches, so I decided to use them in my future iterations. Although these features might lead to a bulkier design, the tradeoff for more security definitely would have been worth it.

A picture of the ATM, located at the intersection of Craig Street and Fifth Avenue, that I based my redesign off of.

an unintuitive entry point

The bigger problem that I had with the ATM was that it took me a while to figure out where to start. If you take a closer look at the ATM's interface, you'll see an interactive screen, three input slots, and a number pad.

But where are you supposed to start? Unless you've used this machine before, you'd probably have to take a minute to look around. Are you supposed to press something on the screen, like the button on the bottom right? Or should you put something in one of the two big slots jutting out on the right side?

Well, it turns out you're supposed to put your credit card in the gray box under the screen. But there's no colors or arrows to clearly denote that this is where you're supposed to start or that this is the most important input. In fact, the check and cash inputs to the side are larger than the card slot. The card slot does say "Insert Card," but nothing indicates that this should be the first action. And if the user can't read English, she is out of luck.

After identifying this starting point, however, the process went smoothly. Thus, finding the starting point was the biggest bottleneck. So to make the quickest design possible, the starting point had to be indicated clearly


A closer shot of the interface. There are many different inputs, so the point of entry is not clear. This is frustrating for users and wastes their time as they have to consciously look for where to start.

iteration 2: making a clear starting point

With feedback from my first iteration and new experience with using ATMs, I focused my second iteration on achieving the first goal - creating a clear and intuitive design.

Because it took me so long to find the card slot/starting point in the existing ATM, I made sure that the card slot was the most noticeable feature on the interface by highlighting the insert, pointing to it on the screen, and having the screen read "insert card to get started."

I also moved the cash/check inputs lower so that they don't compete with the card input for attention.
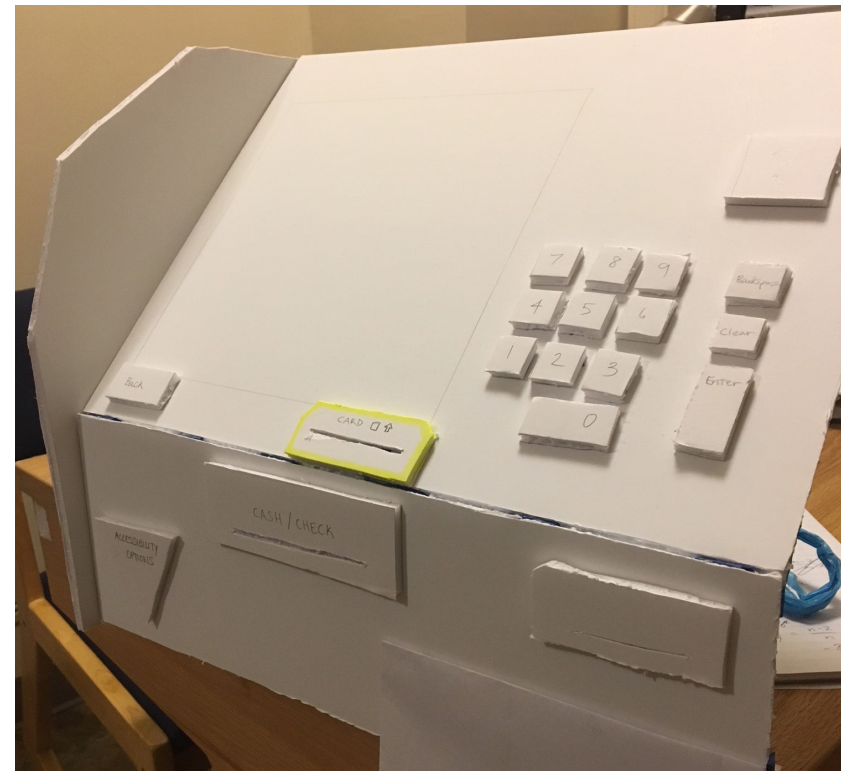

My second design. The card slot is still located under the screen, but it is highlighted. The cash and check inserts are put below the main interface board as to not compete with the card insert for attention

iteration 2: making a clear starting point (cont.)

Since users are likely to look at the screen for instructions if it's not clear where to start, I used the screen to indicate the starting point for the ATM. I added text on the screen to give semantic instructions, and also added an arrow to direct the user's attention towards the card slot.

Of course, some users may not be able to read English instructions, but the other two indicators (the arrow and the coloring of the card insert) should be enough to get a person started with the ATM.
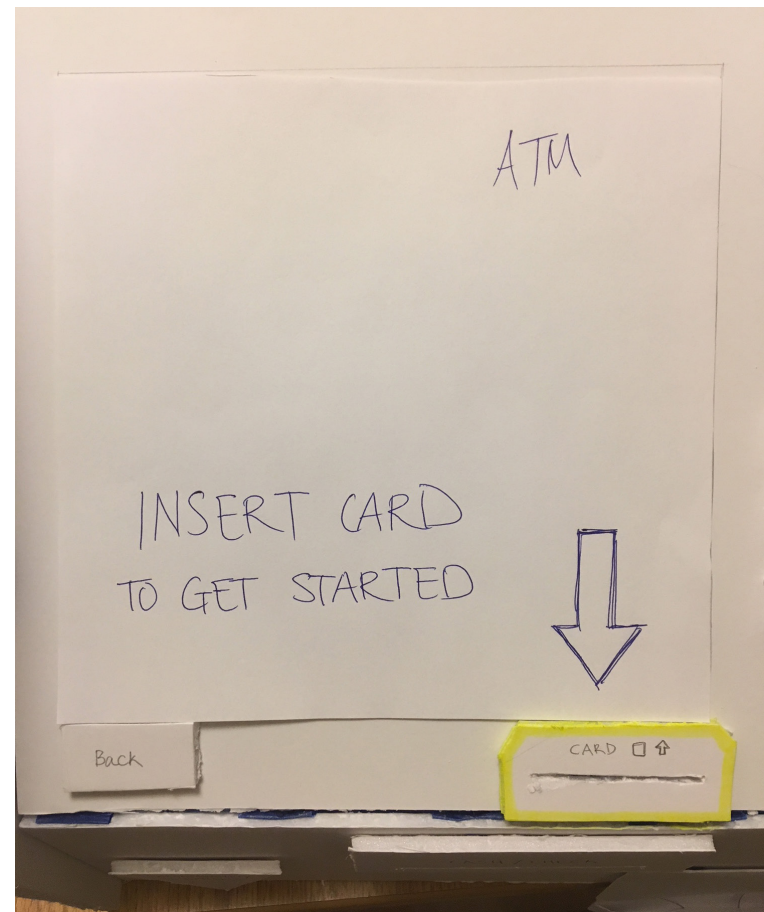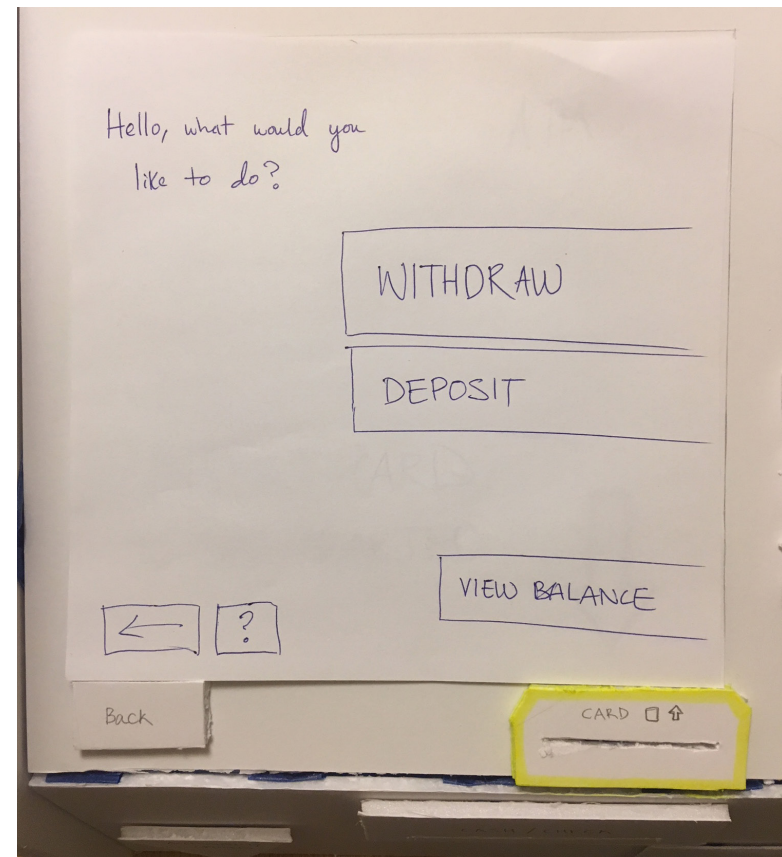
iteration 2: progressive disclosure

In my first design, I relied on a left-to-right and top-to-down hierarchy to tell users when each control should be used. However, this failed for two reasons.

The first reason is that not every control is required for every option. If you just want to view your balance, you don't need to insert cash or a check - so it wouldn't make sense to have a cash/check input to the right of the action buttons just because you would've needed it if you were depositing money.

Taking my lesson from the hodgepodge of inputs from the existing ATM, I decided to use more progressive disclosure in my design - that is, only showing certain inputs when they can be used.

Thus, I moved any button that could have been displayed on a screen to the screen. This way, users wouldn't have to see those options unless they needed to.

The cash/check inputs that had to be physical were placed out of the way, on a different plane from the main interface. Then, the screen would tell the user where and how to use these features if necessary.


The screen now only shows certain options when they are supposed to be used. This reduces the clutter on the interface and reduces the user's cognitive load.

iteration 2: progressive disclosure (cont.)

The second reason that the left-to-right, top-to-down hierarchy doesn't work is that the number pad is required in multiple times in different stages. It's required for both entering a PIN number (which happens right after you insert your card) and for selecting the amount of money to withdraw (which happens after you select the withdraw action, which happens after putting in your PIN). But it wouldn't make sense to create two number pads for these two cases.

My solution to this problem was to use the screen to tell the user when to use the number pad, and then just have one number pad. Since every user would have to use it, I made it as almost as prominent as the screen and the card insert by placing it on the same plane as those two features. Furthermore, I placed the number pad to the right, as most people would probably be used to number pads being on the right of their computer keyboards.
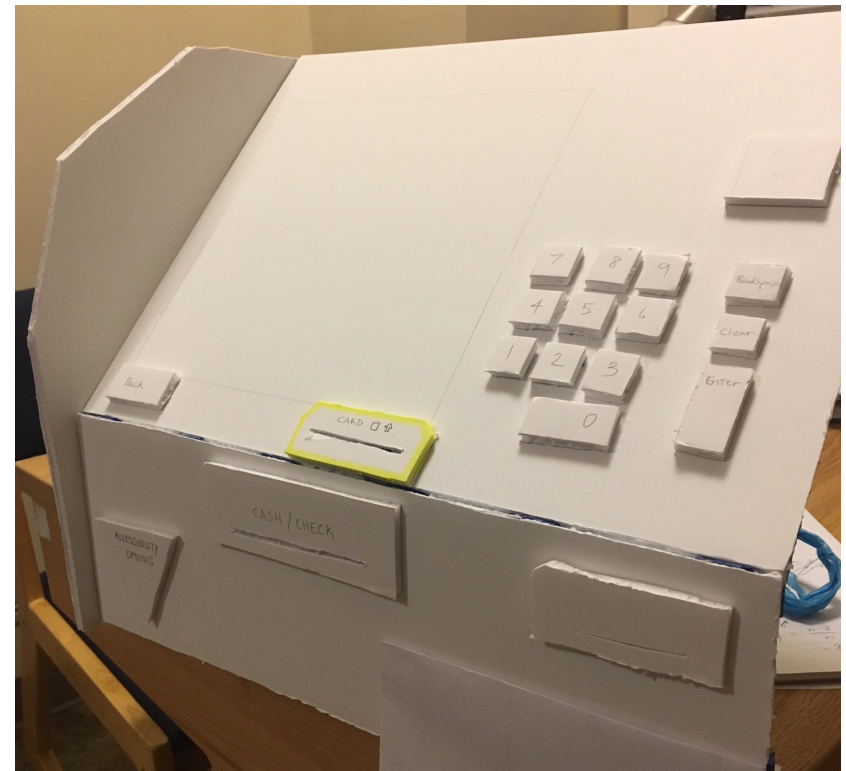
The number pad is on the same level as the screen and card insert due to its importance. As most people are probably used to the number pad on their keyboards being on the right side, the number pad was also placed on the right of the screen.

final iteration: overview

The people who looked over my second design liked that the card slot was clearly labelled as the starting point, so I felt like I met the goal I had for the second design. Thus, I didn't want to mess too much with the control layout, so I wouldn't break anything that already works.

I did have to introduce some new buttons, after learning from my second iteration that the screen was not supposed to be touch screen. This was not too big of a problem. The only function I was using the touch screen for was displaying buttons that could have had physical counterparts next to the screen - so that's exactly what I introduced on the side of the screen.

I did get some feedback from my second iteration for mostly minor things such as decreasing the size of the information button and fleshing out the accessibility options, so I made sure to incorporate them in my final design.

I also reincorporated the security measures that I skimped on in the second iteration to focus on the controls.

My final ATM design. (The foil at the top is supposed to represent a mirror)

final iteration: introducing color

One thing that I felt was necessary to include in the final design was color to 1) give buttons more meaning and 2) make the prototype look more realistic.
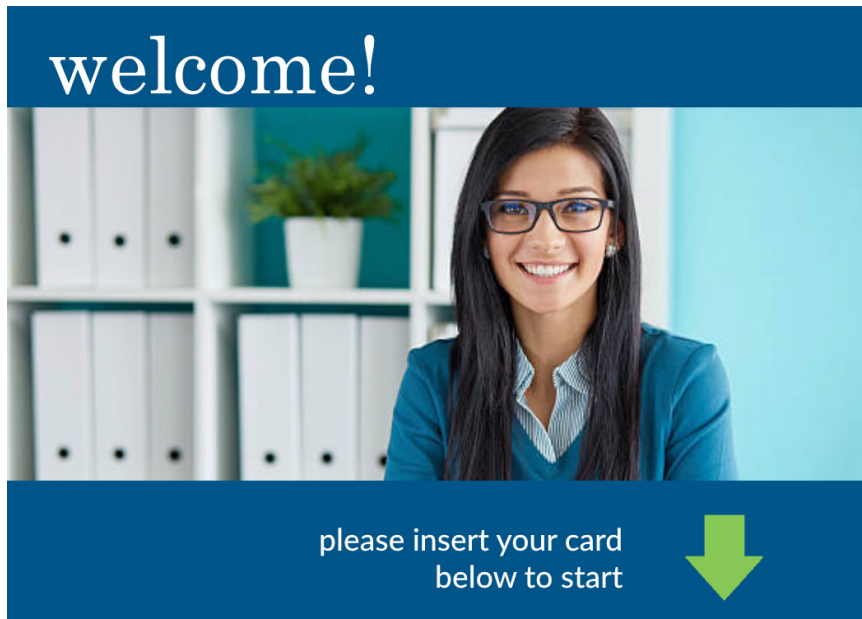
Colors were used to group buttons together by function and give some buttons symbolic meaning in addition to their semantic meaning. An example of such was in making the cancel button bright red.

Color was also necessary to test the prototype in a more realistic setting. The card slot stood out well in my second iteration, but a lot of that could've been attributed to the fact that it was the only thing that wasn't white. So I had to design the card slot to still stand out even when there were other colors on the interface.


I used the same three tactics I used in the second iteration to indicate that the card slot was the most important - I gave it a bright color, I pointed to it on the screen, and I used the screen to give written instructions.

final iteration: screens

welcome!

please insert your card
below to start

hello!
what would you like to do?

withdraw

deposit

view balance

sign out

Most of the work I did for my final iteration was just fleshing out the ideas that I had sketched out earlier. Here are two screens I made for the ATM - the first is a welcome screen whose main purpose is to direct the user towards the starting point - the card slot.
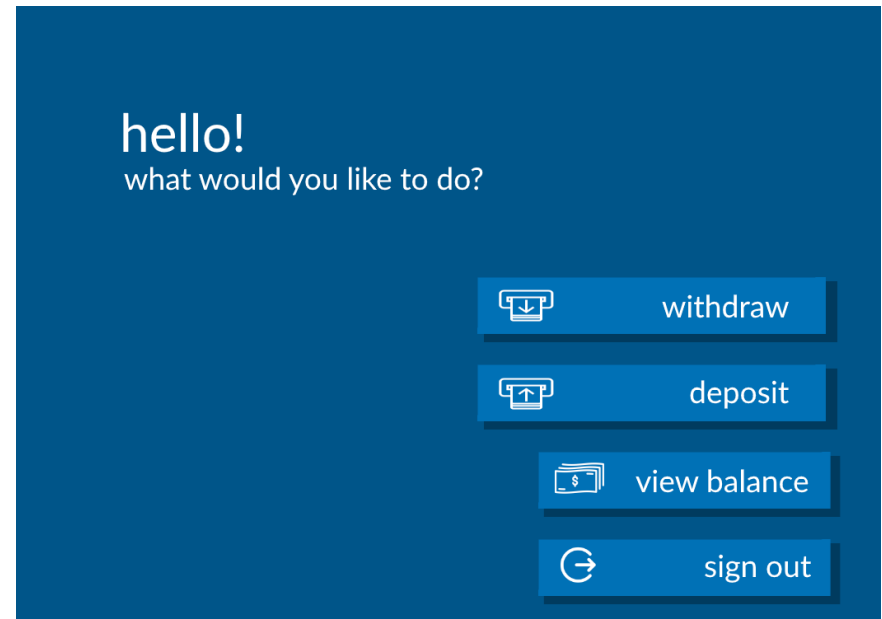
The second screen is an example of the progressive disclosure I tried to achieve in the second iteration - options like these only show up when they are supposed to, and the user can select them from the corresponding grey buttons next to the screen.

pitching the final design

The last step for this design was to pitch it to an audience. I had two minutes to show how my design was an improvement over the existing ATM.

I started off my pitch much like I started off this process book. I first set up the context: it's two in the morning, it's cold, and someone may or may not be following you.

Using this story, I established my goals for my ATM redesign: to make the process of using the ATM as quick as possible, and to make it as safe and secure as possible.

Then, I showed the audience a picture of the existing ATM that I redesigned and explained how there were so many entry points that, by the time the user would've figured out where they were supposed to insert their card, they might have been stabbed.

Afterward, I described how the new design helped take care of some security concerns with the visual barriers and mirror. Then, I explained how the clearly labeled entry point helped guide the user through the process as quickly as possible, before giving a high-level overview of where the controls and features were and how to use them, without getting into the details.

learning from the pitch

I received a lot of feedback from my own pitch and from learning from others' pitches.

People said that they liked how I framed my story - first giving context and then explaining my goals. They also found my pitch humorous at times - although, there were times (such as a comment about getting stabbed) that it seemed a bit exaggerated and ridiculous, which could have damaged my credibility.

Another problem was that, although I started strong, I didn't go into details at certain times when they were necessary, and I failed to give a proper wrap-up, as I kind of ran out of things to say and trailed off at the end. So I have to work on choosing what needs to be elaborated upon and resolving a pitch.

Lastly, there was a suggestion to frame my ATM redesign as a design for high-crime areas, since my big emphasis on security might not have been necessary in many contexts.

I learned a lot from other people's pitches as well. The biggest was that the speaker should never refer to things in first person, i.e. "I feel" or "I did this," because it lessens the speaker's credibility and makes the story about the speaker, not the user.

Another common mistake I saw in presentations that included slides was that there were some visuals and graphs that weren't explained, or didn't really have much to do with the design. So if I ever use slides in my own presentations, I need to be wary of what to include.