

Final Report



TextEx

IEOR 170

Group 15

Spring 2018

Table of Contents

[Project Introduction](#)

[PHASE 1: ABSTRACTION](#)

[Purpose Driven Design](#)

[Definition of the Task](#)

[Task Collection Process](#)

[PHASE 2: CONCEPTUALIZATION](#)

[Competitive Analysis](#)

[User Interviews](#)

[Schematics and Sketches](#)

[Iterative Approaches & Design Selection](#)

[PHASE 3: REALIZATION](#)

[Production Process](#)

[Evaluation Approach](#)

[PHASE 4: REFLECTION](#)

Project Introduction

Our project features the design of a mobile application called “TextEx”, which is essentially an online platform for UC Berkeley students to buy and sell their used textbooks and engage in textbook exchange with other students. The purpose of the design is to create a centralized platform that offers reasonable prices for both sellers and buyers, so that students can get the most value out of their used textbooks and can have a more affordable option for purchasing textbooks.

PHASE 1: ABSTRACTION

Purpose Driven Design

Every semester, college students need to buy textbooks for their classes. At the end of the semester, they often no longer need the books and can get rid of them. How can we make this exchange easier? There are three current solutions to this problem, but they fail as a comprehensive solution for all of a Berkeley student’s needs.

The first is [textbook rental](#). Although rentals through Amazon or the student bookstore can be convenient, not all textbooks are available for rental. Also, rentals are often overpriced compared to used options.

The second is [textbook buyback](#) programs. Although very convenient, buybacks severely undervalue textbooks and will often refuse books in usable but imperfect condition. Buybacks also undervalue textbooks because they have to deal with the overhead of storing and reselling.

The third is [selling the textbook independently](#). Although this extracts maximum value for textbooks, it’s inconvenient. Most of these transactions occur on the Facebook Free and For Sale page and are mixed with other listings that have nothing to do with books. There is no easy way to search for a specific title or course and save books for later.

By giving students a central place to buy and sell all their textbooks that is convenient and offers fair prices, we think our design will fully address student needs.

Definition of the Task

Hierarchy

Buyers and sellers will message each other directly within the app in order to arrange a place and time to meet at their own convenience. Since the app will be limited to students at Cal, they will likely meet somewhere on campus so that no one person will have to travel too far to make the exchange.

Information Flow

By using the messaging platform from within the app students can exchange information regarding a specific book. The conversation will be initiated by the buyer who is interested in the book. The buyer will ask questions about the book which might include pictures or any details regarding how the book was used in class.

Sequence & Timing

Most textbook exchanging will take place in the beginning of the semester. After listing their textbooks, sellers will wait until they are messaged by potential buyers. Once the seller chooses a buyer that they can meet with, they will agree on a time and place to meet. When the physical exchange of the book takes place they buyer will provide electronic or cash payment at the same time, depending on their mutual preferences.

Location & Environmental Context

The tasks will likely be performed on campus or in another public space like a coffee shop. We will recommend that users perform the transaction in a public space in order to maintain safety for both parties.

Task Collection Process

Physical Requirements

Sellers will have to collect and scan textbooks in order to list them on the app. Buyers and sellers both will have to physically meet in order to make the textbook exchange.

Cognitive Requirements

Users will have to be comfortable with the mobile app platform. They should be able to add textbooks to sell with minimal manual input. When searching for a book, they should be able to quickly find what they need by using relevant filtering.

Task Assessment

This is a well-known issue, and there are solutions that currently address the problem (see Purpose Drive Design section). Current solutions are certainly useful, but are not comprehensive and do not fully maximize value and convenience for students.

Textbook buyback is limited by store overhead, which lowers value for students.

Textbook rental isn't comprehensive and it fails to address local customization for each student body. Individual textbook selling is extremely inconvenient.

An obvious technological competitor to the physical textbook space is digital textbooks. While these certainly exist, many people prefer physical books and the physical book market is still significant, even though we have the technology to go fully digital.

PHASE 2: CONCEPTUALIZATION

Competitive Analysis

Our conceptualization phase started with a more detailed competitive analysis of some current methods that students utilize to buy and sell used textbooks. As we mentioned earlier, there are some problems with these current methods which are making the process of textbook exchange difficult, and we wanted to find out the pros and cons of

each approach in order to gain a better understanding of the problem we were trying to tackle as well as gaining some insights into what we needed to incorporate in our design.

The first major approach is purchasing used textbooks from marketplaces such as the student store and Amazon. Although buying books through Amazon or the student bookstore can be convenient, the cost still remains generally at a pretty high level. Other options available on these platforms include things like e-textbook and textbook rental, but not all textbooks are available with these options, and students are often held back because of the potential limitations imposed by those options, such as not being able to leave any marks on a rented textbook.

The second option is selling used textbooks through textbook buyback programs, which is actually offered in many different places, including the Cal student store and some textbook selling websites like Chegg. Although very convenient, buybacks severely undervalue textbooks and will often refuse books in usable but imperfect condition. My personal experience with the buyback program was not very pleasing. While I bought my used French textbook for over 150 dollars, and used it for only one semester, the quote I got for my buybacks from the same website was 25 dollars, which severely discouraged me from actually making the effort to participate in the program because I could not get a lot value out of it.

The third approach is selling textbooks independently, which usually takes place on free-and-for-sale groups on Facebook. Although this extracts maximum value for textbooks, it's extremely inconvenient -- it involves personal meetups and sketchy transactions. On the one hand, because of the existence of multiple groups, a seller needs to post information at multiple places to ensure that the post is viewed by a larger group of potential buyers. And because of the lack of specifications regarding pricing and listing details, the seller needs to make up his/her own post, which can be very inconvenient and tends to deter many people from trying to sell a used textbook. On the

other hand, it also takes a lot of efforts for buyers to find textbooks because of the existence of more than one centralized platform and the poorly designed searching tool.

User Interviews

Based on the analysis above and the problems it revealed to us, we confirmed our design option to be a centralized mobile platform that allows for easier textbook exchange between students. For the scope of this project, our target users will be limited to students at UC Berkeley. After doing this initial analysis, we began conducting interviews with students. We asked them questions pertinent to their experience with buying and selling used textbooks. Because our users can have two separate roles when interacting with our potential platform, which are sellers and buyers, we wanted to be able to collect feedback from both angles and therefore created separate question lists. Here is the interview guide that we followed to make sure our interviews were well-structured.

For buyers:

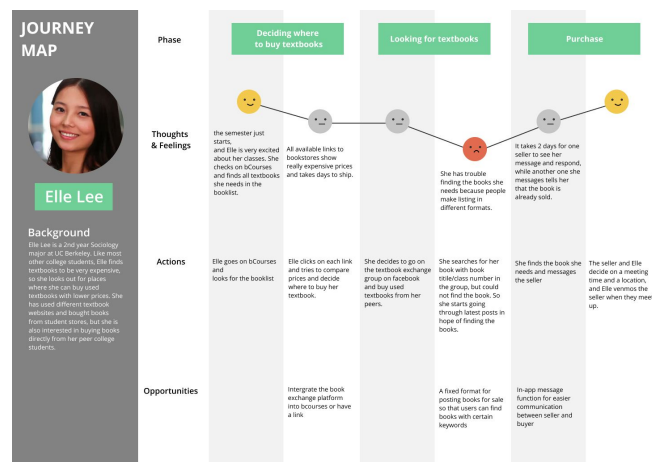
- Where do you usually buy your textbooks from?
- Why do you choose this place/method? What are some of its advantages and disadvantages?
- What are some factors you consider before deciding where to buy your textbooks from? (e.g. price, convenience, credibility)
- Do you compare prices before purchasing? If so, how?
- Have you ever used an online platform for purchasing textbooks?
- Have you ever tried to buy textbooks from your peers?
 - If not, what stopped you from doing so?
- How do you rate the level of difficulty of finding the textbook you need in a facebook exchange group?
- What are some keywords you use to search for books?
- What frustrations did you have with buying textbooks from your peers?

For sellers:

- Do you usually sell your used textbooks?

- If not, what stopped you from doing so? What improvements would have given you more initiative to sell your textbooks?
- Do you sell it through buyback programs offered by student stores or textbook-selling websites? Or do you sell them to your peers?
- What are the advantages of this approach of selling textbook?
- Have you ever listed books for sale in facebook textbook exchange groups?
- What are some information that you usually include in your description?

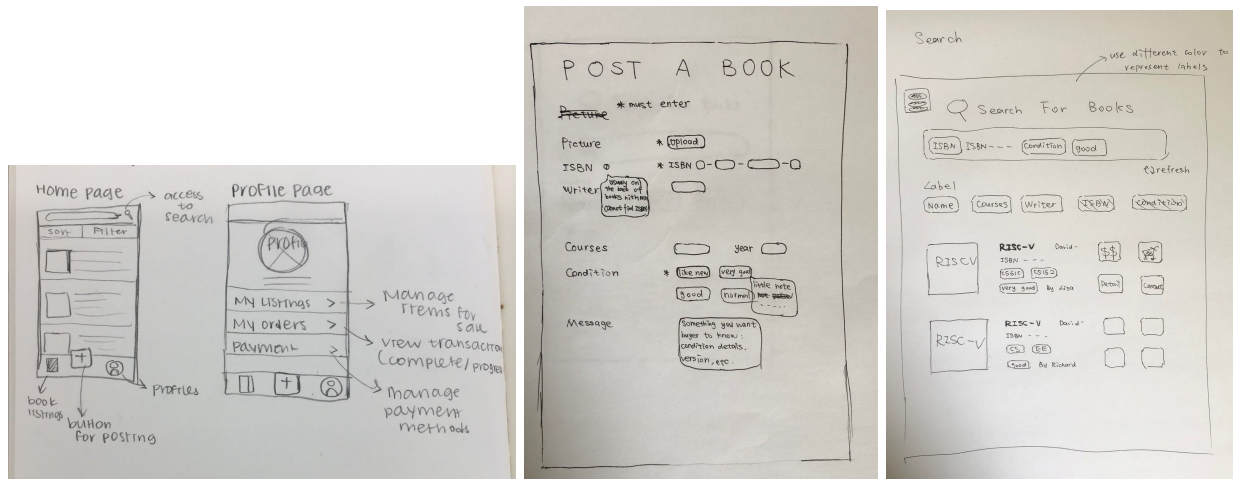
Based on the results from user interviews, we created a journey map to plot the pain points of buying textbook, and we used the experience with a Facebook free-and-for-sale group as an example, because that is one of the most popular choices.



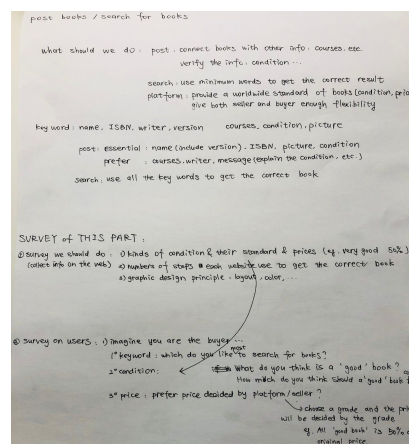
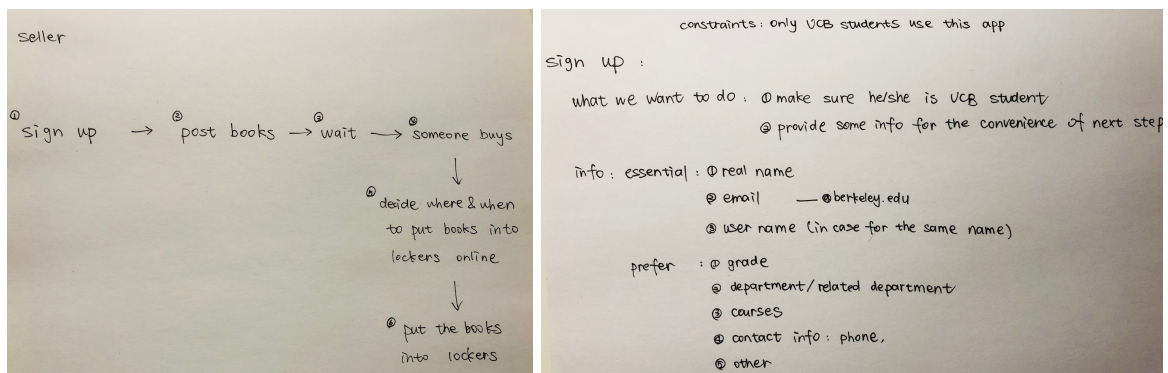
Drawing from the competitive analysis and user interviews, we found several pain points that we would like to address with our design. First, our design should incorporate a clearer procedure for listing a book for sale on the platform. The process should not be too complicated so that users will not be deterred from posting. The instruction on how to add a textbook for sale and what to include when adding should be clearly outlined and provided to the user. Second, we need to incorporate a way for users to search for textbooks with different types of keywords, such as title of the book, author, class number. Third, we need to have a messaging function built within the app so that buyers and sellers can directly communicate over any issues or questions they might have.

Schematics and Sketches

With these ideas in mind, we began creating some low-fidelity sketches that focused on the design of each screen as well as the overall flow of some important actions.



Here are some notes on user flows:



Iterative Approaches & Design Selection

As we started ideating for user flows, we first considered how to incorporate the information about textbooks that the user is required to get for his/her classes. At first, we decided not to include any information on that part, with the assumption that our users would come to our app with enough knowledge about what books they needed. However, later, we discovered that it would be the best to provide this information to our users to reduce the cost of accessing information. Therefore, we decided to include a bCourses integration, through which our users can log into our app with their CalNet ID and access their booklist on their profile page. Later, we also found that it would be more intuitive to display this booklist when the user is searching for books. So we made a “suggestion” bar on the search page, which provides suggested keywords based on the classes the user is taking and the required books for those classes.

Another important feature that evolved through our design was the concept of a “library”, which is essentially a place for the user to hold all textbooks that he/she currently owns and sells. The idea is that users can add textbooks that they possess to the library without necessarily posting them to the marketplace immediately. This approach replaced the initial idea that the user could only manage the books that are for sale. Instead, there is greater flexibility in terms of controlling the collection of textbooks.

PHASE 3: REALIZATION

Production Process

As we were making wireframes, we aimed to make our user flows as simple and intuitive as possible, and we also made references to the user interface design principle for the design of each screen. Here are some of the principles that we made references to and how we implemented our design to follow these principles:

Principle 1: Discriminability of content

We used different fonts and different weights to display various kinds of information. For the less important information that is not functionally useful, we used lighter stroke for the font.

In addition, for buttons that are placed right next to each other, we tried to make sure that there is enough contrast

between the two by using different colors

and negative vs positive display, so that users have enough distinction to draw upon at a glance and will not easily press the wrong button.



Principle 2: Implementing the principle of pictorial realism

Courses



According to the principle, display should look, be oriented like represented variable. Therefore, we use icons that people are familiar with, such as the icon of a book to represent 'LIBRARY' as shown in the picture below. Also, we used the "+" sign for the add button and "-" sign for the delete button.

Principle 3: Implementing the principle of consistency

We keep a consistent layout for screens with similar functions. For instance, we keep the screens of adding a book (for the seller) and viewing a book (for the buyer) the same layout.

In the next steps, we are going to create a style guide and a component library to specify the visual design parameters (color schemes, font hierarchy, spacing) as we move forward with our high-fidelity prototype.

Principle 4: Color coding

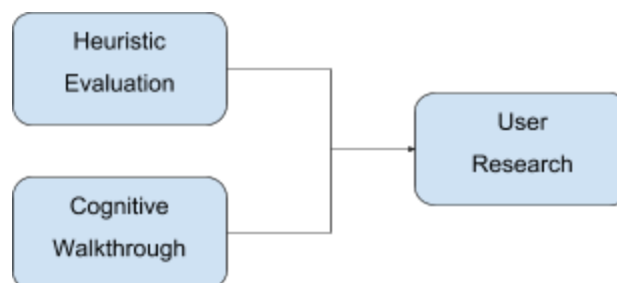
We use mostly blue and white as our primary colors for a simple and neutral style that might create some kind of peaceful feeling, which is consistent with studying and reading books. Some of the colors are also consistent with the Cal colors.

In order to make the notification message bar stand out from the cooler color, we use red as our warning color. When there are unread messages/notifications, a red dot would show up at the corner of the “MESSAGE” icon so that users are reminded to check messages on time.

Principle 5: Minimizing information access costs

- To minimize information access costs for our users, we put frequently accessed sources in locations such that travel cost is small.
 - We tried to ensure that relevant buttons and information are located near each other. For instance, we list all the options users might need to search for a book right under the search bar (sort and filters).
 - The four most important screens are accessible through the icons on the bottom bar so that users can easily switch back and forth between screens

Evaluation Approach



1. Heuristic Evaluation

For the heuristic evaluation, we are planning to use the 10 Usability Heuristics for User Interface Design developed by Jakob Nielsen

(<https://www.nngroup.com/articles/ten-usability-heuristics/>) as a guideline for our user testing.

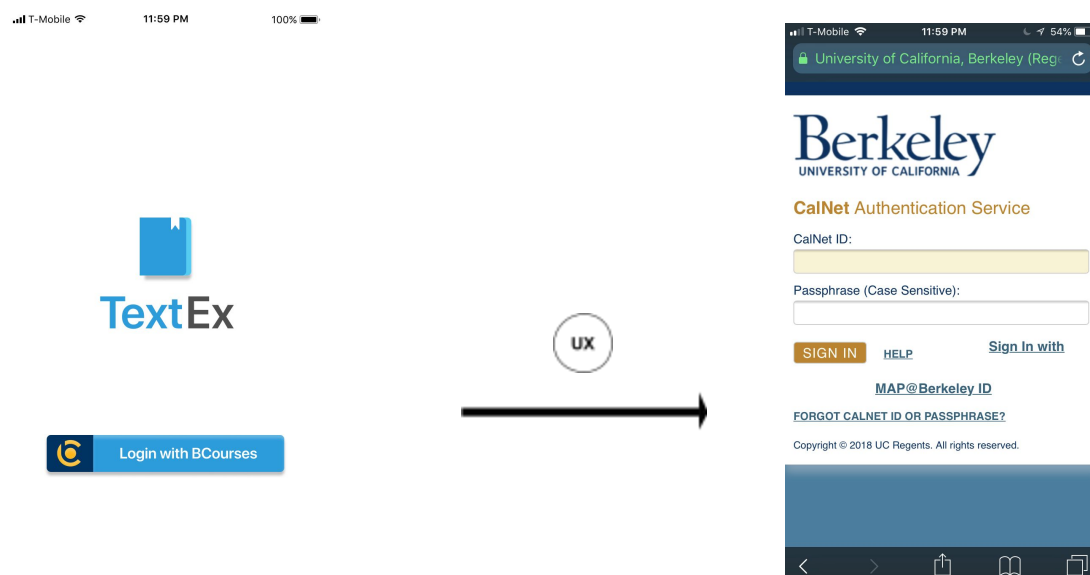
To test the impact of our design, we are planning to conduct user testings with approximately 10 UC Berkeley students who identify themselves as buyers/sellers of used textbooks. We will show them our mid/high-fidelity prototypes and ask them to perform several tasks, such as posting a book for sale, finding a book for a class, and completing a transaction on the app. During the process, we will observe our users as they proceed with the action and document the pain points where they make errors or spend extra time figuring out the next step. Some variables that we want to keep track of during the tests include numbers of clicks needed to complete certain tasks and number of errors the user makes during a specific action. We will also ask questions regarding the design of each screen as well as the overall user flow in relation to the 10 heuristics.

2. Cognitive Walkthrough:

Here, we will provide you with a walk-through of the processes of logging in, selling a textbook, buying a textbook, and using the built-in messenger function on our app.

(*screens or flows that have the icon  means that it needs further user research)

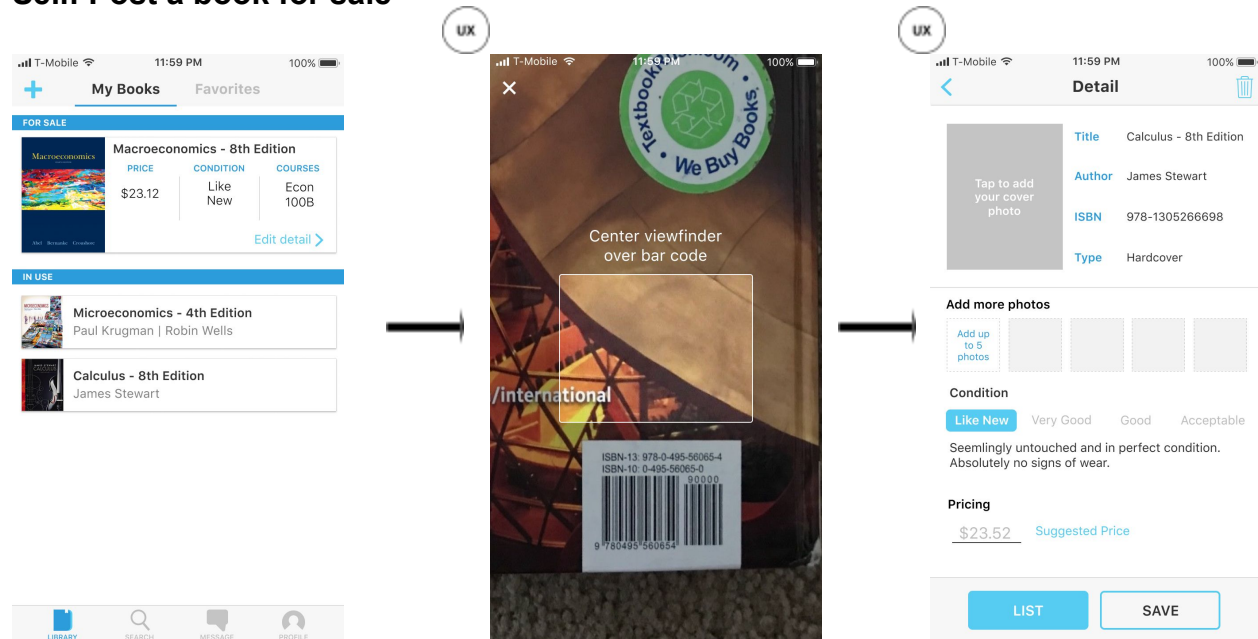
Login



The only way to log in is through bCourses, as one constraint for our app is that only UCB students can use it. We consider that most (over 80%) of the UCB students can access bCourses.

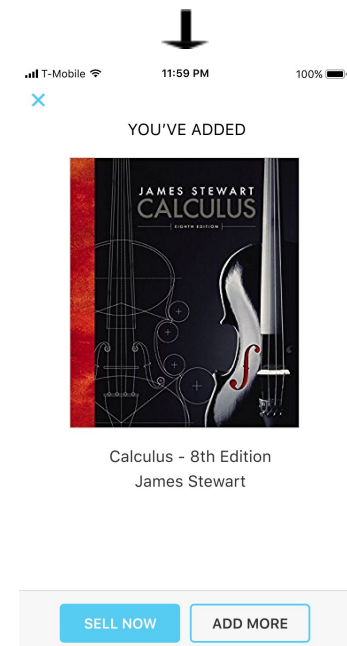
UX: preferred ways to log in

Sell: Post a book for sale



Possible Errors

- Users(sellers) type in the wrong book name/class number, etc. by accident when adding a listing
 - We resolved this issue by adding a camera scanner that allows users to directly scan the code of the book and input the relevant basic information automatically before listing a book.
- The condition categorized by users does not match the actual condition of the book, because different users have different standards



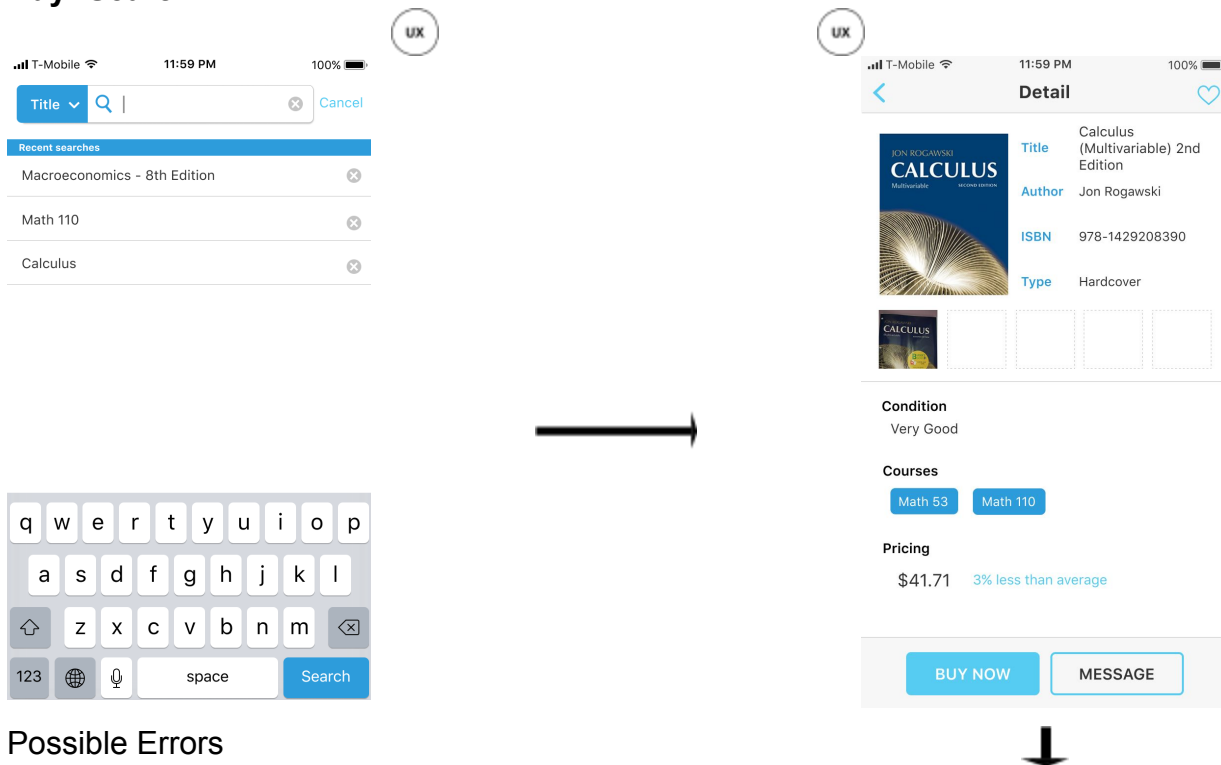
- We resolved this issue by providing description of each book condition when users are adding a book for sale

UX: preferable ways to post books

understanding of books condition

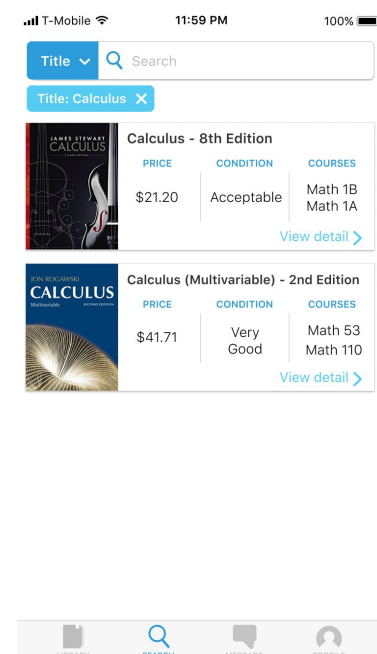
Prices problems for sellers and buyers: suggested price or not, etc.

Buy: Search



Possible Errors

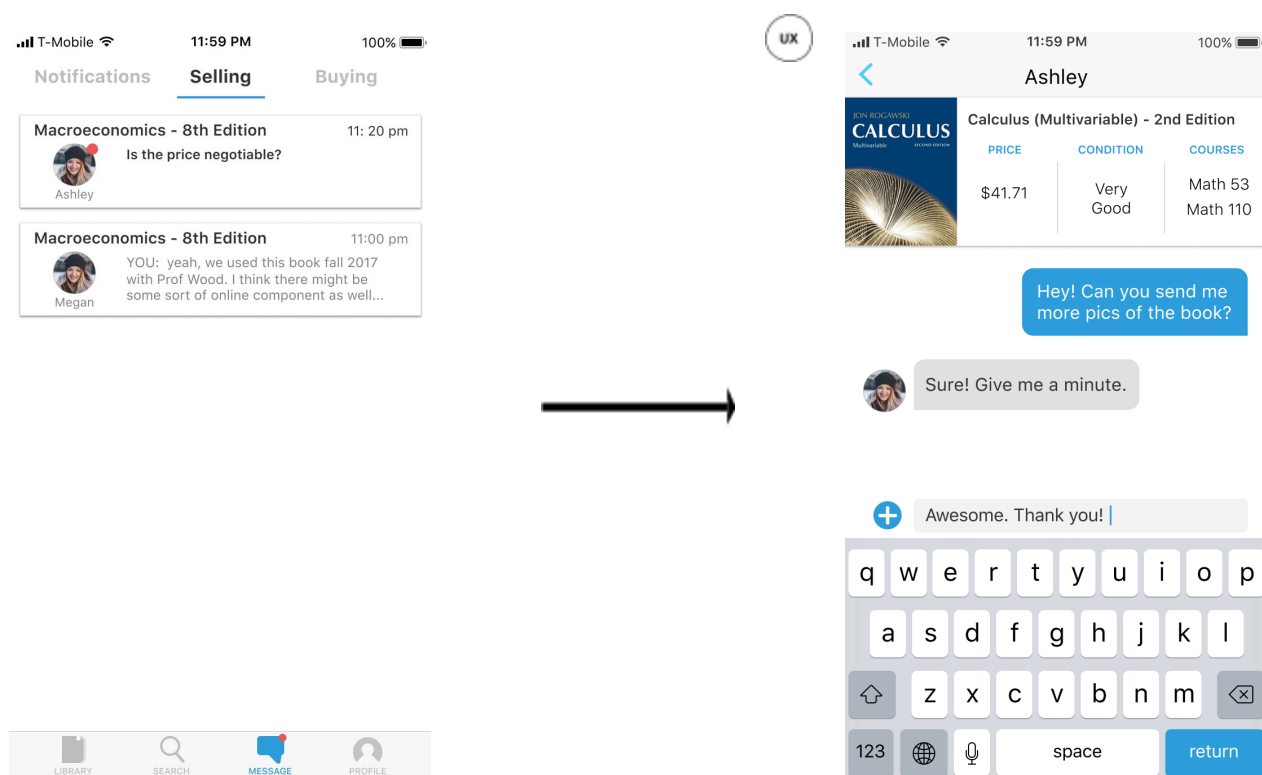
- Users (sellers) search for a wrong books
 - We resolved this issue by adding more alternative types (label) for users to search including courses, ISBN, etc.
- Users (buyers) buy the wrong edition of the book
 - To prevent this error, we make sure that the visual hierarchy is clear and easy to follow, so that users can easily notice the most important information, such as book title,



edition, class name, etc. when they are browsing for books.

UX: preferable labels/words when searching for books

some information about textbooks (does version always change, does version of books influence your study, etc.)



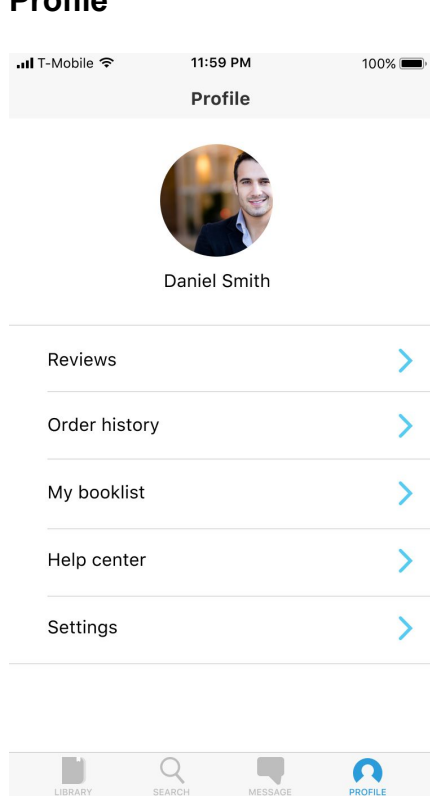
Possible Errors

- Users forget to confirm the order after a transaction has been complete (lapse)
 - Make sure to include a detailed guide during the onboarding process so that users get a clear sense of the steps involved in one transaction
 - Make the notification section in the message screen easier to notice and more alerting, and send out reminders in this section to confirm order completion

UX: things the user wants to know about the book when buying

understanding of books condition

Profile



UX: Things the user wants to know about each other (either the buyer or the seller), which would determine what other things to include in the user profile

Based on the Cognitive Walkthrough above, we designed a Google Form for further user research through which we would like to gain more insights on how we can improve our existing features and user flows. Here is the link to the Google Form:

<https://goo.gl/forms/HSC17anajOb7FQUu2>.

Below are a quick summary of the list of questions we would like to address and dig further into through this short user survey:

- What is the preferred way for the user to login
- Preferred ways to post books
- Understanding of books condition
- Pricing problems for sellers and buyers: do they want to see suggested price or not
- Preferred labels/words when searching for books
- Some information about textbooks (does the requirement for a specific edition always change, does the edition of books influence the user's study, etc.)

- Things the user wants to know about the book when buying
- Things the user wants to know about the seller / the buyer

PHASE 4: REFLECTION

Over the course of the semester we've learned a lot about the design process.

Although our product is mostly a digital user interface, the physical design methods we have learned informed how we thought about the user experience overall. However, we mostly thought about our design within the context of the last couple weeks of the class. The topics on UI/UX and Displays/Controls were by far the most helpful.

As a lot of the most pertinent lessons for our project came towards the end of the semester, we didn't really get a chance to iterate on our concept for the digital user interface as much as we had hoped. Although we had carefully considered many aspects of the design and the physical circumstance surrounding textbook exchange far earlier in the semester, we hadn't really had the chance to consider the finer points of the user interface. If we had to choose an area we'd most like to improve on it would most likely be making the design of the interface more clear and the language more relevant.

Since most of our group comes from a primarily computer science background, it was definitely rewarding to learn so much about the world of human factors and physical design. So many software products are paired with a physical component, especially as IoT and other technologies are becoming increasingly popular. Although our team has designed and developed software in the past, none of us had really considered how we might design for physical interaction.

At the end of the day we are proud of the product we designed and hope to continue developing it in the future. We believe strongly in the need for a textbook exchange at Cal and think that this product could make a positive difference in the lives of every single one of our fellow students.